West Texas Number

15 Cents a Copy

The OIL and GAS JOURNAL

PRODUCING REFINING MARKETING

Published Every Thursday TULSA, OKLAHOMA, FEBRUARY 23, 1928 $5.00 a Year

FEB 24 1928

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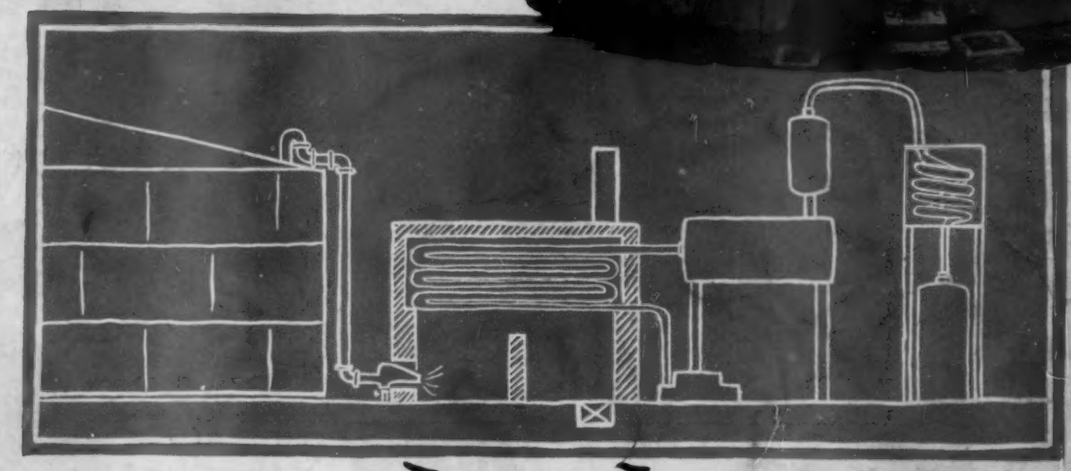
A WIGGINS FLOATING ROOF



Saves enough to heat a still

YOU can't pipe the vapor from a tank vent to a still and burn it, but you *can* save this evaporation loss just as surely by applying a Wiggins Floating Roof to any working tank. It is estimated that the annual saving on a single gasoline rundown tank handling 1000 bbls. per day will pay the heating cost of running 171,000 bbls. in a modern still.

The Wiggins Floating Roof will ordinarily pay for itself in less than a year on any working tank at a refinery or pipe line pumping station. After that, it continues to pile up important savings. Can you afford to overlook such economy?

For standing storage the Wiggins Breather Roof, companion type to the Floater, will stop evaporation. Details on request.

Chicago Bridge & Iron Works

Chicago

FLOATING *for working storage* — WIGGINS ROOFS — BREATHER *for standing storage*

O&GJ 2-23 Gray

Advertisers' Index on Page 25 Table of Contents on Page 26

The longest *station to station* call within the U.S. now costs only $10

An Advertisement for Bell Long Distance Telephone Service

THE longest telephone call you can make within the U. S. is from Eastport, Maine, to the town of Bay, California. Under the new rates, the station to station day charge for this call is now only $10. More than ever you will now be surprised how little long distance calls cost. Business more and more is using the long distance telephone to save trips, buy and sell goods, make appointments and collections, get important things done on time.

A New York company made 14 long distance calls to department stores in 13 cities and sold $37,320 worth of specialties, "all of the transactions having been started and completed by Long Distance at a very nominal cost." A firm of Toledo brokers in one year sold $5,000,000 worth of produce by long distance calls. "Seventy-five per cent of our bean business is done over the telephone. . . . We can get in closer touch with the buyer and understand conditions at his end of the line." In eight months, a tire concern sold $3,180,000 worth of tires by telephone at a sales cost of 2%.

What far-away calls could you profitably make, now? Just ask for the long distance operator and place your call by number . . . it takes less time. . . . *Number, please?*

AMERICAN TELEPHONE & TELEGRAPH CO. AND ASSOCIATED COMPANIES — BELL SYSTEM

An installation of Walworth 6, 8 and 10 inch Valves
Indian Territory Illuminating Oil Company
At Little River Field, Indian Territory

ALL over the oil country one finds more and more big installations of Walworth Iron Body Valves. This nest of 6″, 8″ and 10″ Iron Body Flanged Valves is an example of literally hundreds of jobs in the production and refining fields, where engineers are turning to Walworth as their source of supply for all kinds of valves.

FIG. 2139 IRON BODY O. S. & Y. DOUBLE DISC SCREWED GATE VALVE 700-POUND TEST.

Walworth makes a complete line of iron body, brass and steel valves and fittings, especially designed for oil country service. Where the engineer's opinion carries greatest weight, there you will find Walworth equipment on the important installations.

WALWORTH

Walworth Company, General Sales Offices: 51 East 42nd St., New York
Plants at Boston, Mass.; Kewanee, Ill.; Greensburg, Pa., and Attalla, Ala.

Distributors in Principal Cities of the World

Walworth Co., Limited, 10 Cathcart St., Montreal, P. Q.
Walworth International Co., New York, Foreign Representative

The Oil and Gas Journal, issued weekly by The Petroleum Publishing Company, 114-116 West Second Street, Tulsa, Oklahoma. Subscription price $6.00 a year; 15 cents a copy. Entered as second-class mail matter December 15, 1911, at the post office at Tulsa, Okla., under the Act of March 3, 1879.

L665.051 0391 540715 268089

WALWORTH
STILLSON

THE story of Stillson Wrenches typifies Walworth leadership. In the Smithsonian Institution you will find the first Stillson ever made. Dan Stillson figured it out in the Walworth factory more than half a century ago. It is now become the most famous and the most frequently copied tool in the world. When we think of its popularity and the distinct preference on the part of good mechanics for its direct and legitimate descendants, still made in the Walworth factories, we are reminded of a quotation from Plutarch used several years ago in our advertising:

"Agesilaus being invited once to hear a man who admirably imitated the nightingale, declined, saying he had heard the nightingale itself."

You will find Walworth products at all Frick-Reid Stores, backed up in our great central warehouses with reserve stocks on which the big operator may draw with confidence as to price and delivery.

FRICK REID SUPPLY COMPANY

Axelson Machine Co.
Sucker Rods, Pull Rods, Plunger Working Barrels (Pumps) etc.

Beaumont Iron Works Company
Dreadnaught Rotary Equipment, Water-Cooled Drawworks, Pumping Hoists, Traveling Blocks, etc.

Carbic Manufacturing Co.
Acetylene Gas Generators and Welding Equipment.

Donovan Boiler Works
Oil Country Boilers and Tanks.

Frick-Reid Service Belting
Rubber Covered and Friction Surface.

Jensen Bros. Mfg. Co.
Pumping Jacks

National Transit Pump and Machine Co.
Power and Steam Pumps.

J. P. Ratigan
Grips, Clamps, Beam Hangers.

Joseph Reid Gas Engine Company
Gas and Oil Engines, two and four-cycle, Band Wheel and Direct Drive Pumping Powers.

Whitlock Cordage Co.
Manila Cordage, including Frick-Reid Manila Bull Ropes—same quality for ten years.

Lapweld and Seamless Tubular Goods

Walworth Company
Valves, Fittings and Tools for Steam, Water, Gas, Oil and Air.

Rossendale-Reddaway Company
"Camel Hair" Belting, Belt Clamps.

Engineering Crews
for the installation of Pumping Powers and related equipment.

Tulsa, Okla. Pittsburgh, Pa.
West of the Mississippi, Stores Everywhere
East of the Mississippi, The Frick & Lindsay Co.

Fight the WASTE of bottom water with EAGLE LEAD WOOL

Bottom water—one of the serious causes of production wastes in many oil fields—is plugged off instantly by Eagle Lead Wool. Producers have saved many thousands of barrels by using this effective conservation weapon. Stocked by all important supply houses—with cartridge containers in sizes to meet all requirements. Write us for free folder and further information.

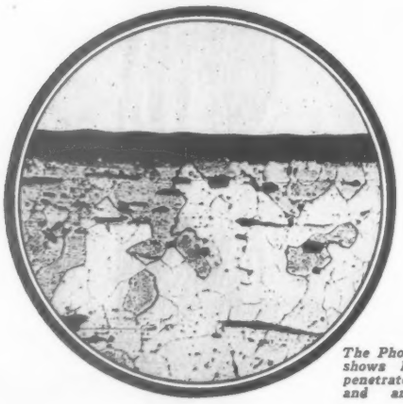
The Eagle-Picher Lead Company · Chicago · Joplin · Cincinnati.

The light, low-cost metal for your sockets

Eagle Rope Socket Metal was designed especially for all socketing purposes. 35% lighter than Number 4 Babbitt—4 times as hard (Brinell hardness 64). Tough—will not crack or break under shocks and strains. At your dealer—or write us for free folder.

Amaloy Coated Pipe

A New Reading Product



The Photomicrograph shows how Amaloy penetrates the iron and anchors fast.

HERETOFORE protective coatings as a protection against the inroads of corrosion have been unsatisfactory. They were either not sufficiently adherent or were porous.

Reading Iron Company announces that its Amaloy Coated Pipe will resist acid corrosion to the nth degree. We advocate its use wherever corrosive conditions are extreme, for by every conceivable test—tortional, tensile and flattening it fulfills our expectations. Amaloy actually anchors itself into the body of the metal. Nothing seems to dislodge it. All threads on pipe and couplings are completely coated. We are prepared to furnish Amaloy Coated Pipe for Tubing, Casing and for Refinery Service.

READING IRON COMPANY
READING, PENNSYLVANIA

HOUSTON TULSA FORT WORTH LOS ANGELES SAN FRANCISCO

READING PIPE
AMALOY COATED
GENUINE WROUGHT IRON

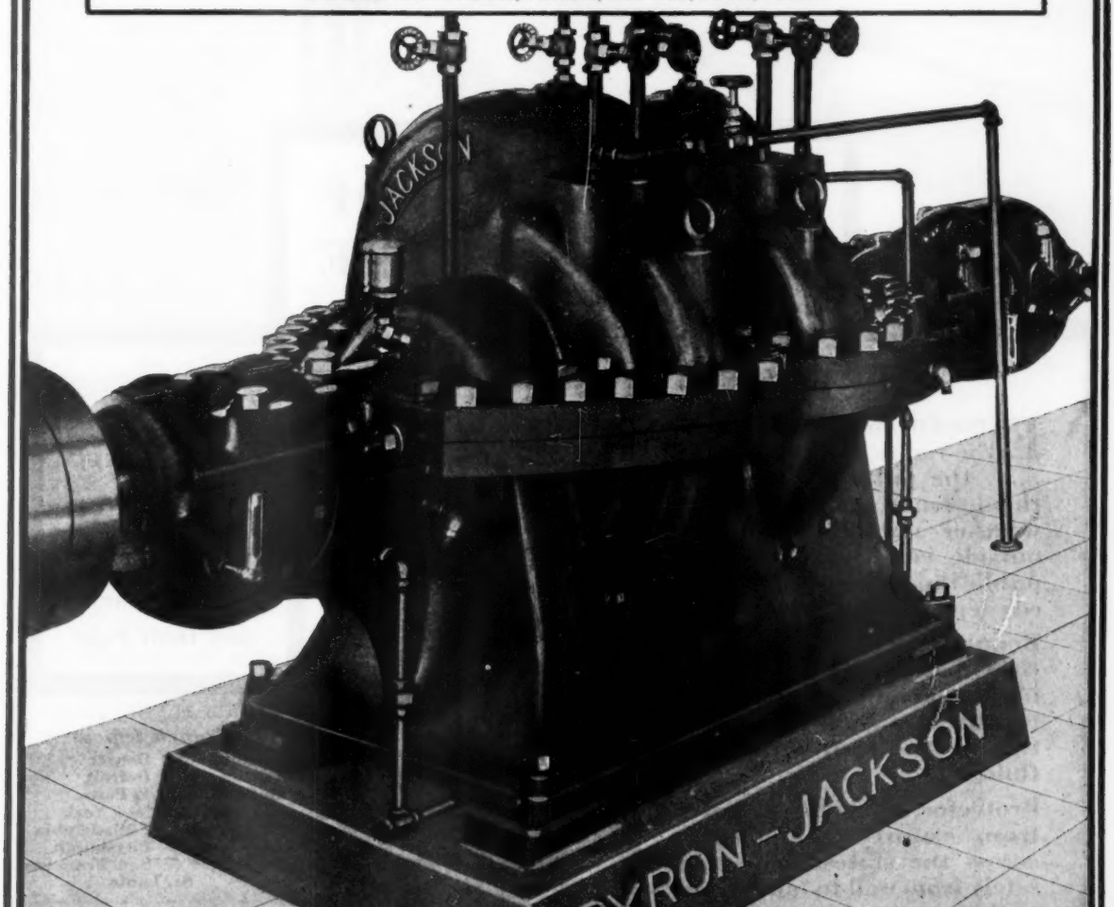
PROVEN

This Byron Jackson centrifugal pipe line pump is the symbol of revolutionary accomplishment in the oil industry. Many oil companies have proved its superiority by the most severe tests ever imposed on any type of pump.

BYRON JACKSON PUMP MFG. CO.

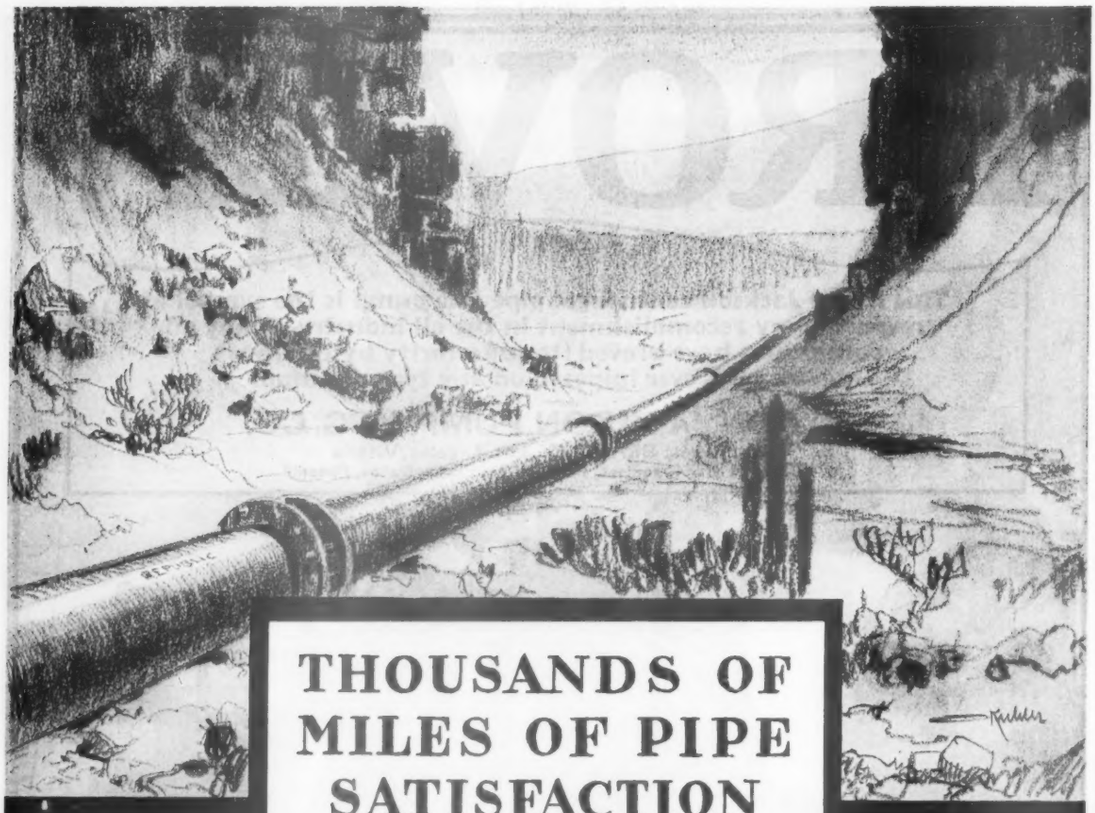
Factories: BERKELEY, Los Angeles, Visalia

Branches: San Francisco, Portland, Salt Lake, Dallas, Phoenix



BYRON JACKSON

CENTRIFUGAL PUMPS FOR EVERY SERVICE



THOUSANDS OF MILES OF PIPE SATISFACTION

EXPOSED and subjected to the rigors of daily service . . . the pull of the pump, the destructive influences of weather and other unusual outside conditions . . . Republic Pipe remains unscathed, dependable.

Republic Steel Pipe is serving the Oil and Gas fields unfailingly and enduringly . . . a tubular transportation system for the earth's valuable fluids.

Protector, as well as carrier from county to county, across the states, delivering safely from well to tank, from tank to refinery, year after year.

You can measure pipe-line satisfaction in terms of Republic Pipe.

PRODUCTS

Tubing
Casing
Line, Rotary
and Drill Pipe

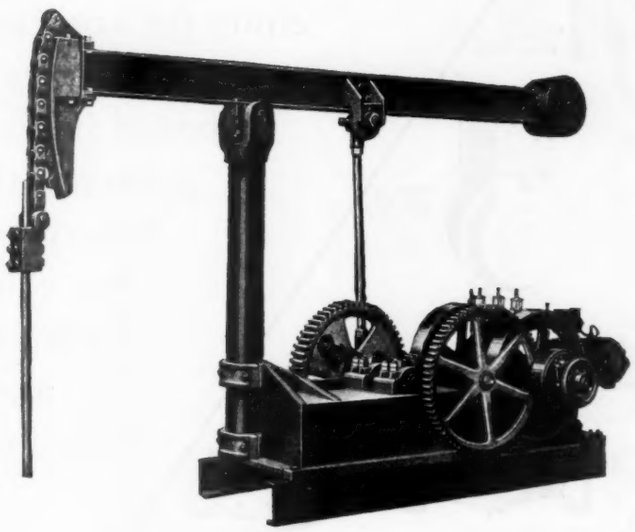
Branch Offices

Birmingham	Denver
Boston	Detroit
Buffalo	El Paso
Chicago	New York
Cincinnati	Philadelphia
Cleveland	Pittsburgh
Dallas	San Francisco
St. Louis	

REPUBLIC
IRON & STEEL CO. YOUNGSTOWN O.
PIPE & CASING

A Straight Pull

Heavy Roller Chain and Sprocket in place of Links



"Pattin" 5 H.P. Single Well Pumping Power Weight 2275 lbs.

HERE is a single well pumping power suitable for wells 2,000 feet deep, equipped with a heavy Roller Chain and Sprocket which permits a straight pull—giving additional strength to the unit.

This power is fitted with our new 5 H.P. gas or gasoline engine, is fully water jacketed (not hopper cooled), has Wico igniter and both gas and gasoline attachment.

With a normal speed of 20 strokes per minute, it can be adjusted to 15 in., 18 in., 21 in. and 24 in. stroke.

Two one-hundred pound counter balance weights are regular equipment and are made to form a box on top of beam. This box can be filled with old iron to increase counter balance if necessary. Both engine and power are mounted on 6 in. channels and very easy to handle.

PATTIN PRODUCTS
Gas Engines
Pumping Powers
Water Pumps
Air and Gas Compressors
Vacuum Pumps
Oil Country Boilers
Torpedo Reels and Clamps
Steel Storage Tanks
High Pressure Tanks
Howe Casing Heads
Shackle Irons

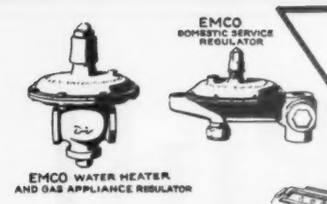
THE PATTIN BROS. CO.

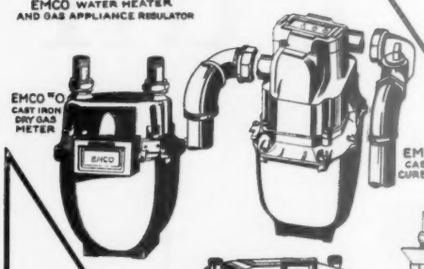
Watch for Announcement of our New 100 H.P. Unit.

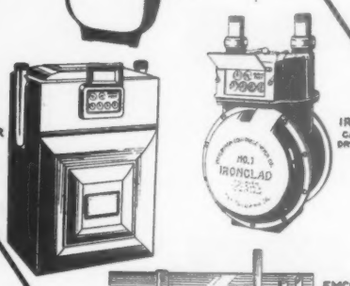
Write for prices, or inquire of any of our representatives.

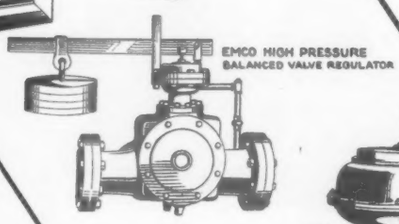
THE PATTIN BROTHERS COMPANY
MARIETTA, OHIO

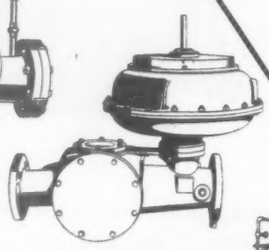
Tulsa, Okla. A. S. Dunnington
Nowata, Okla. J. Barnes
Wichita Falls, Tex. J. W. Noland
Putnam, Tex. Putnam Supply Co.
Bradford, Pa. Blaisdell Machinery Co.



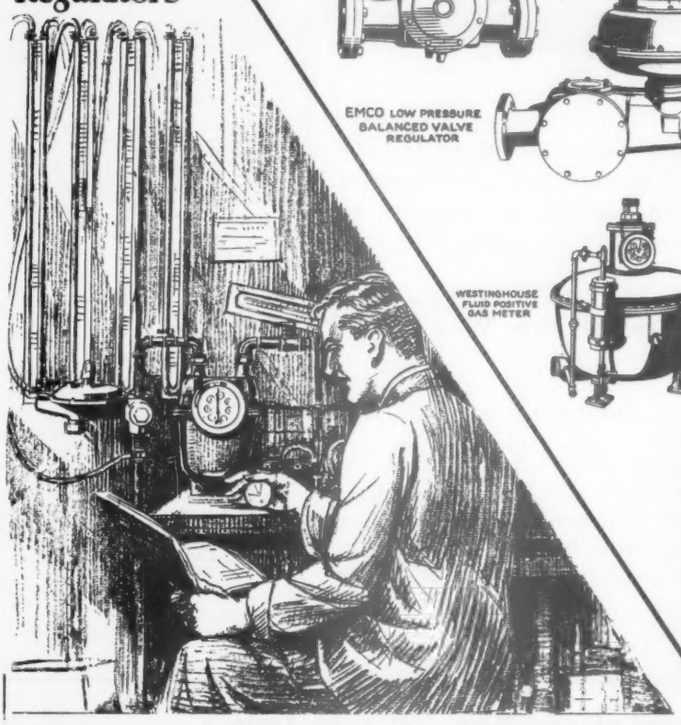


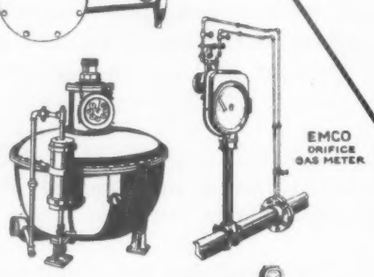


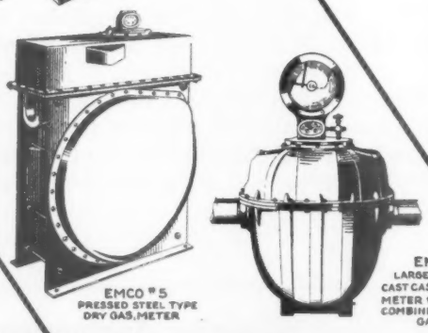




Testing Domestic Service Regulators







Design Principles

A careful study by our Engineering Department of proper principles for accurate measurement in meters and perfect control in regulators, together with 30 years' experience in building equipment for the Gas Industry assures to our customers absolute satisfaction.

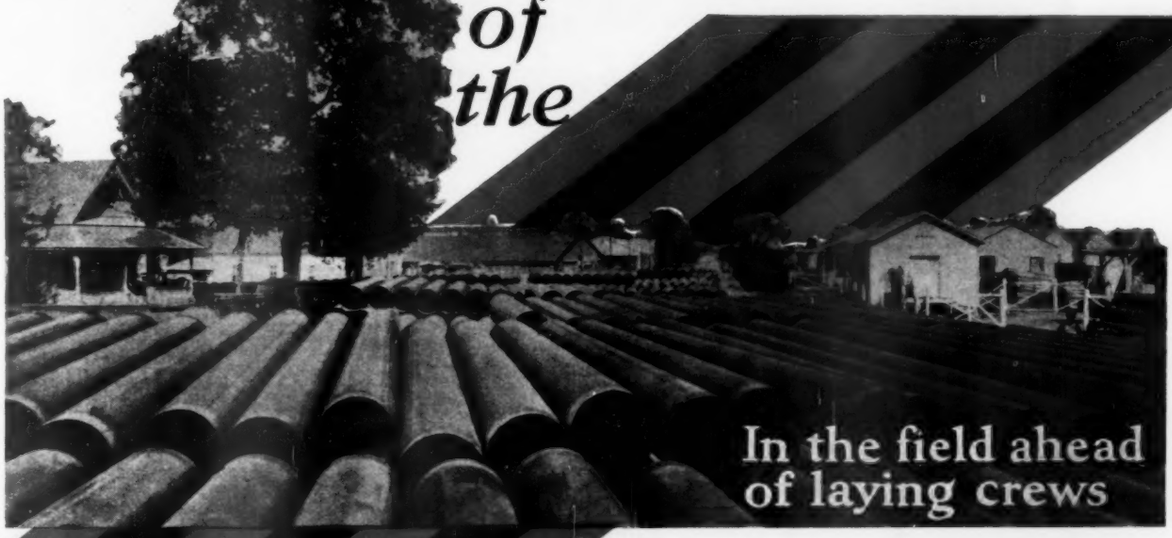
PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS TULSA SEATTLE KANSAS CITY SALT LAKE CITY

CAPACITY

of the



A. O. SMITH
CORPORATION
Pipe Mill

has been INCREASED from 4½ to

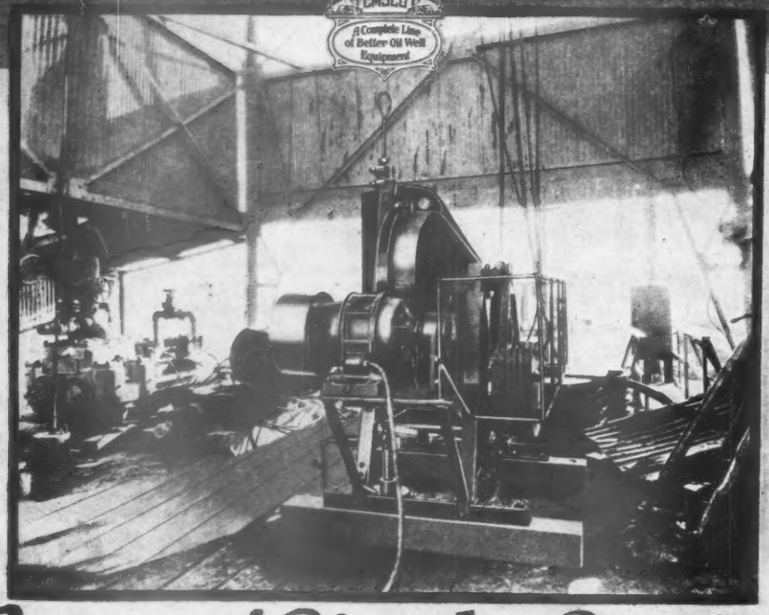
6 *to* 8 Miles Per Day

according to diameter

16 to 24 Inch

SMITHSTEEL
GAS LINE PIPE

A. O. SMITH CORPORATION
Oil & Gas Field Products Division
General Offices—Milwaukee, Wis.
District Offices at New York, Pittsburgh, Tulsa, Houston, Los Angeles



The Improved Simplex Pumping Jack

IT TAKES a lot to satisfy us—oil men everywhere had put their O.K. on the Simplex Pumping Jack, designed by us for wells from 1500 to 2500 feet in depth. Yet we weren't satisfied. We redesigned parts, rebuilt portions—and now an improved Simplex Pumping Jack is ready!

Here are some of the things we've done: increased the size of the main bearings on which the main drive gear shaft and crankshaft rotate. [Two oversize Timkens here.] We increased the size of the jackshaft and drive pinion shaft bearings. We replaced the front crank gearshaft bearing with a heavy SKF roller type bearing. Used heat treated nickel steel on all shafting.

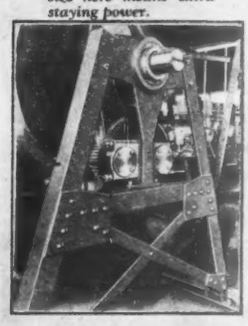
Then we put in high speed gears of the quiet herringbone type. We completely enclosed all the working parts of the jack. Sheet steel aprons at the front and rear keep out dust and keep oil and grease inside. We built in a heavy sheet steel oil drip-pan, which can be connected directly to the sump-hole to take care of excess oil.

We increased the size and strength of the jack guard that protects the counterbalance.

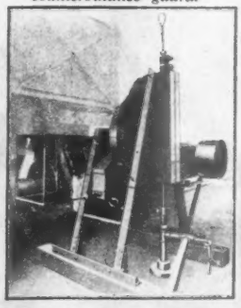
We're hard to satisfy—but the new improved Simplex Jack is just about the ultimate!

After you've studied the illustrations, may we send you specifications? A postal will do.

A closeup of the main bearings in the improved Simplex. Extra size here means extra staying power.



Showing the sheet steel enclosure for the jack, also the drip-pan and counterbalance guard.



Emsco Steel Equipped

EMSCO
Derrick & Equipment Company
Los Angeles, California.
Houston, Texas.
New York Office: 150 Broadway
Factory Branch at Tulsa

Wells Are Safe.....

100 YEARS OF STEEL IMPROVEMENT

Number Twelve in a Series of Advertisements

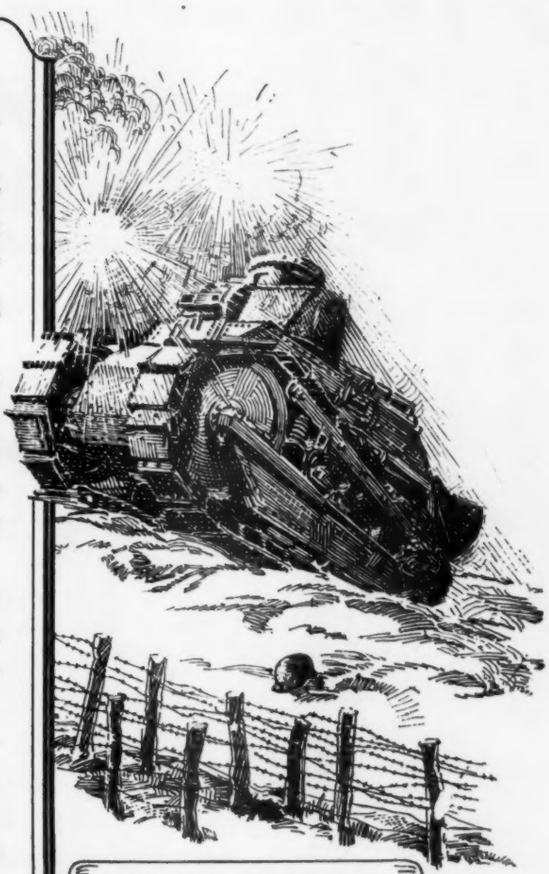
THE WORLD WAR

ADDED ANOTHER CHAPTER TO THE RECORD OF NICKEL ALLOY STEELS; FURNISHING NEW PROOF OF THEIR DEPENDABLE PROPERTIES

WITH the intensive mobilization of men and materials during the successive stages of the late war, there was an increasing demand for Alloy Steels that would stand up under the stress and shock of active, gruelling service.

Different types of Nickel Alloy Steels were employed by the leading combatants for such diversified uses as armor-plate—gun forgings and mounts—tank armor and tractor shoes—crank and propeller shafts for naval vessels—and for many other important items that required high strength combined with toughness.

The many years of Nickel Steel development have contributed to an extensive fund of information concerning the superior properties and many uses of these alloys. You are invited to consult our engineers and thus draw upon these helpful data.



For the bullet-proof plate of the tanks a 5% Nickel Steel—often with fractional percentages of other alloying elements—was adopted. Shafts, gears, and tractor shoes were also made of standard Nickel Alloy Steels.

SOME STANDARD APPLICATIONS OF NICKEL ALLOY STEELS

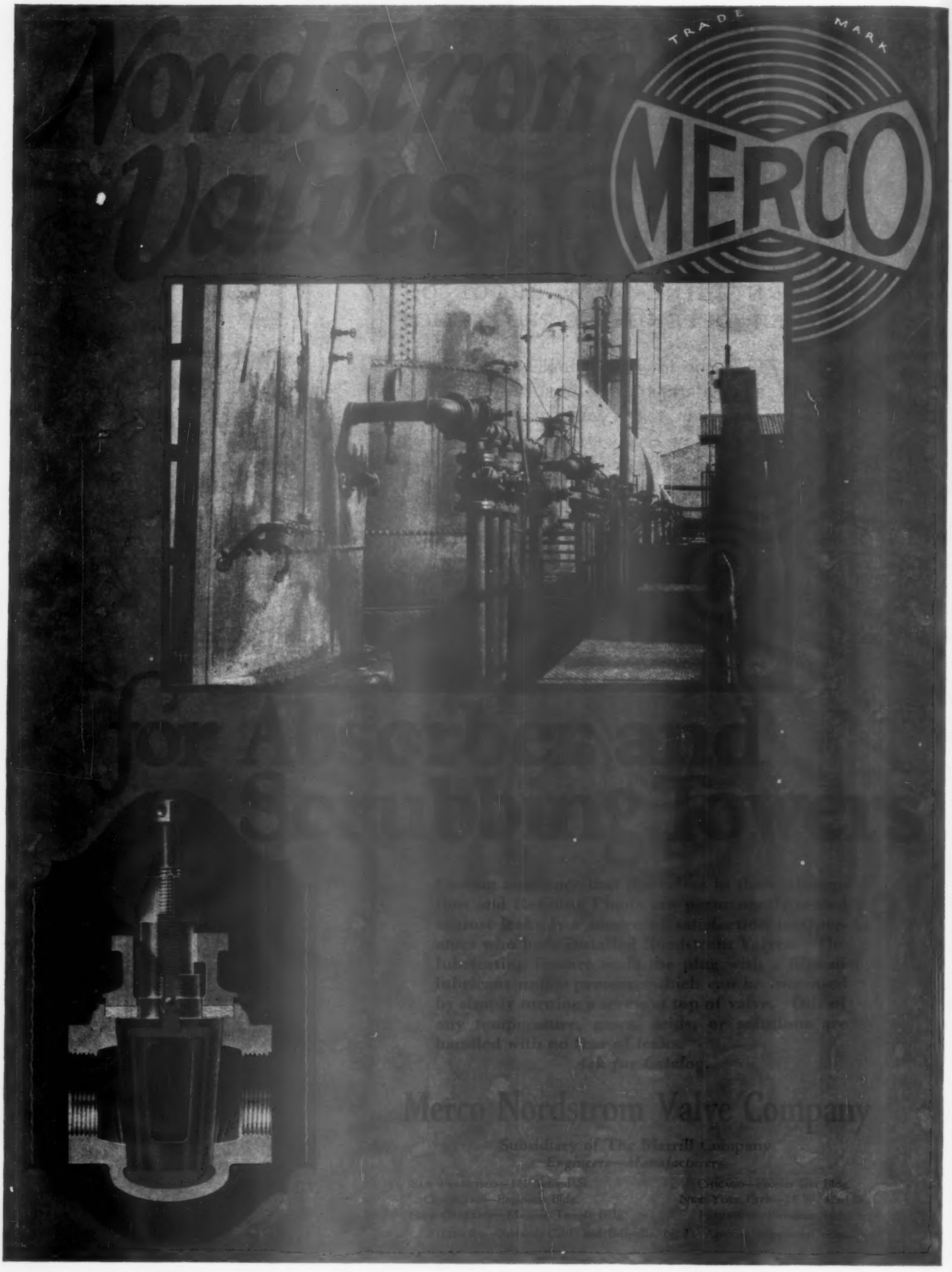
Armor-Plate	Ordnance
Axles	Railway Track Work
Boiler & Fire Box Plate	Roller Bearings
Boiler Tubes	Shafts
Bolts, Nuts, Rivets, etc.	Shovels
Castings	Special Tools
Crank Shafts	Steel Mill Rolls
Dies & Die Blocks	Structural Shapes
Forgings	Turbine Blading
Gears & Pinions	Valve Bodies
Mechanical Tubing	Welding Rod

FOR STRENGTH WHERE THE STRESS COMES
ALLOY STEEL

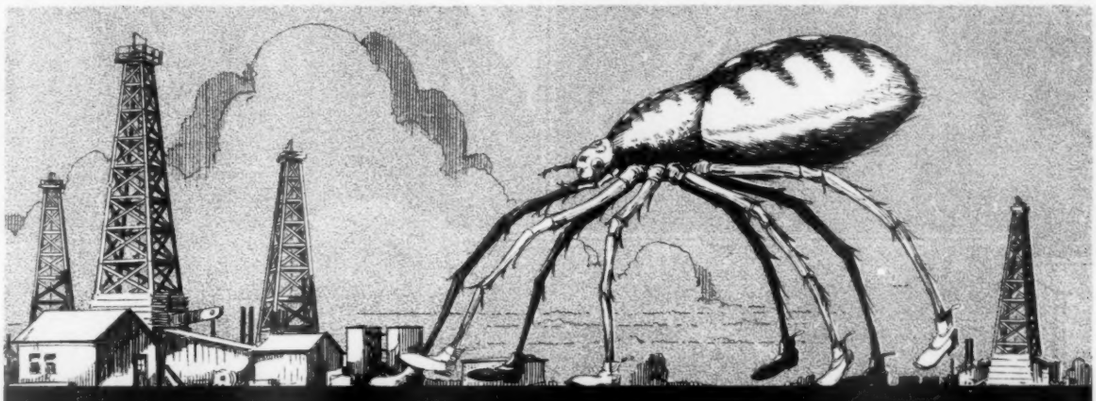
Send for Buyers' Guide of Nickel Alloy Steel Products

Nickel
FOR ALLOY STEEL

INCO NICKEL THE INTERNATIONAL NICKEL COMPANY (INC.), 67 WALL STREET, NEW YORK, N. Y. INCO NICKEL


More Merco Valves
TRADE MARK
MERCO

SUPPLY
BOVAIRD
COMPANY

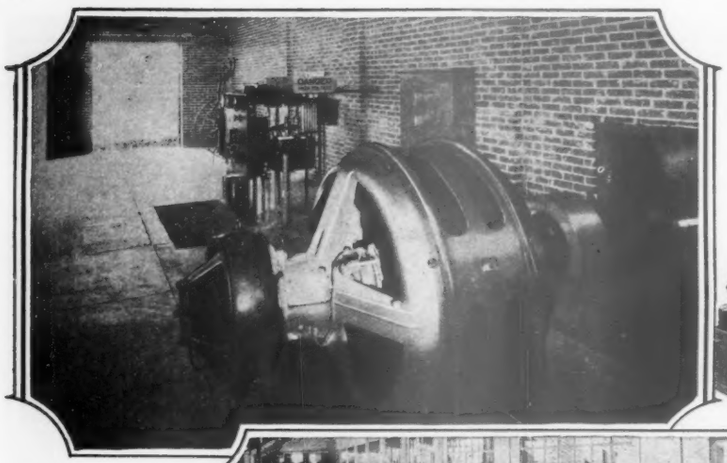


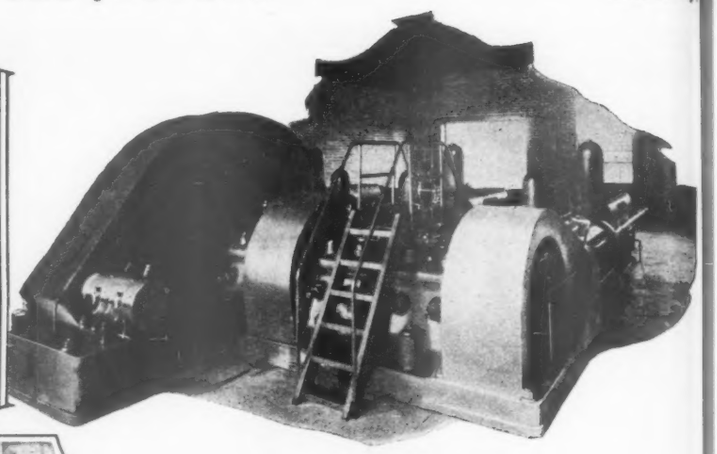
MANY STEPS AHEAD
of its nearest Competitor

BOVAIRD
***GRIP* TUBING**
SPIDER

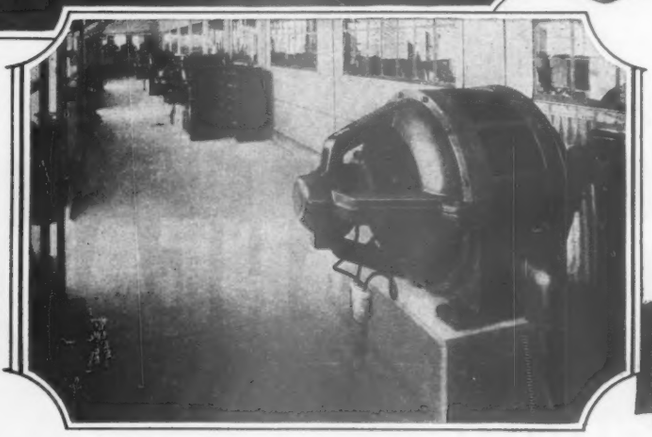
[904 Mid-Continent Bldg.
TULSA, OKLAHOMA]

BOVAIRD

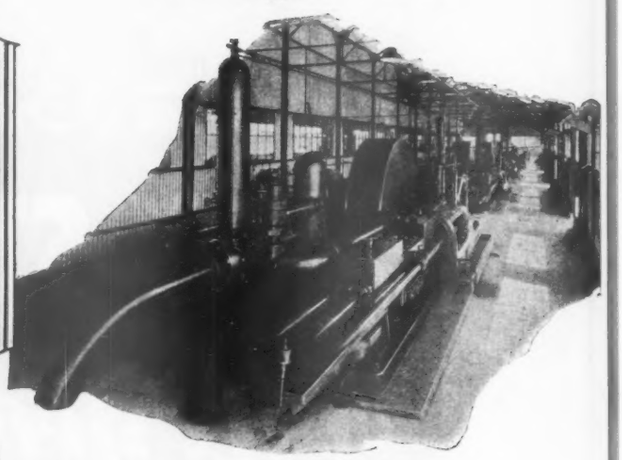




One of the G-E 600-hp. synchronous motors driving 25,000-barrel pump at Oklahoma Pipe Line Co., Council Hill, Okla.



Four G-E 200-hp. induction motors driving pumps at the Empire Pipe Line Company, Lima, Okla. This equipment handles 32,000 barrels per day.



Why Electric Power *for pipe lines?*

Here are ten good reasons why electric drive for pipe lines appeals to progressive oil operators:

1. Its initial cost is lower.
2. It costs less to install.
3. It can be housed in inexpensive structures.
4. It solves the question of water supply.
5. It requires less man-power—and no skilled attendants.
6. It costs less to maintain.
7. Its depreciation is less.
8. It is unaffected by extremes of temperature.
9. Its flexibility is greater.
10. It is more reliable.

Whether you use centrifugal or reciprocating pumps, G-E Motorized Power is readily adapted to your requirements—there is no better drive for your pipe line equipment. Your nearest G-E office is always ready to supply information and other service.

General Electric supplies complete electric equipment to the oil industry. With warehouse facilities close to your operations, G.E. readily furnishes motors, controllers, transformers, arresters and other protective devices, capacitors for power-factor improvement, switching equipment, etc.

G-E oil field specialists and G-E service at: Dallas, Denver, Houston, Kansas City, Oklahoma City, Tulsa, Los Angeles, San Francisco.

Apply the proper G-E motor and the correct G-E controller to a specific task, following the recommendations of G-E specialists in electric drive, and you have G-E Motorized Power.

Motorized Power
—fitted to every need

200-144

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

A SAVING OF 100 BARRELS PER TANK

—*Says the U. S. Bureau of Mines*

Aluminum Painted Tanks, Yount-Lee Oil Company's Tank Farm, Beaumont, Texas

THE Bureau of Mines Report, Serial No. 2677, states that in one year a black-painted "55" oil storage tank loses 649 barrels by evaporation, a red tank 609 barrels, a grey tank 547 barrels and an Aluminum-painted tank *only 447 barrels*—a clear saving of 100 barrels per tank over the next best practicable color.

Aluminum Paint is the most economical paint because of its saving in evaporation loss. But this is not all. It is most economical in its *lasting quality*. It retains its reflectivity. It has remarkable protective qualities—not only against rust, but also against destructive fumes, even those of hydrogen sulphide.

And it costs no more than ordinary paint.

These are the reasons behind the wide-spread use of Aluminum Paint in the oil industry—on storage tanks and refinery equipment—on tank cars and tank trucks.

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Trade Mark

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The Best Steel Sucker Rod yet produced

"JONES SUCKER RODS"

A great welcome has been accorded this new Sucker Rod of ours,—a rod with a forged box and pin, and made of a high fatigue resistance steel that is stronger by 150% than any sucker rod steel now in use.

It took us over three years of continual laboratory research to develop this super-steel—a steel that not only has the highest fatigue resistance known in sucker rod steel, but a steel that increases the elastic limit over 40%.

Think what this super-strength steel Sucker Rod means in service—think how much more it will stand the gaff of wear and tear.

Then, consider the simplicity of stringing these new Jones Sucker Rods which eliminates just half of the joints in a string, and thus enables you to connect rods faster and with less possibility of trouble than ever before.

All the joints, of course, are built to A.P.I. Specifications. In fact, nothing has been left undone to make this new Jones Sucker Rod the *best rod* ever produced—bar none.

Just try 'em out.

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Allis-Chalmers motors are specified for oil field service because they have the stamina that is necessary for continuous operation with the minimum of attention. Each part is designed for maximum strength and protection against shutdown.

Frames of electric furnace cast steel, unit core construction, silver brazed indestructible rotor, extra sealed moisture and acid resisting insulation, and Timken Roller Bearings are assurance of no interruptions.

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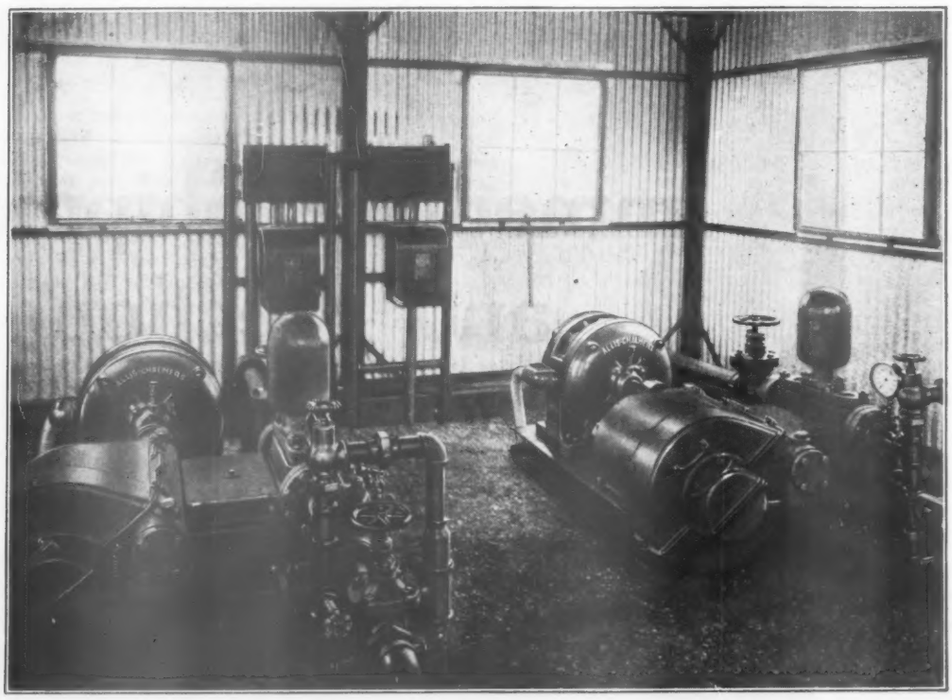

20 H.P., 440 Volt, 685 R.P.M., Allis-Chalmers Motors Direct Connected to Triplex Pumps. Empire Company, Little Rivers, Okla.

ALLIS-CHALMERS MANUFACTURING CO.
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A new kind of "confidence game"

THE NEW KIND of confidence game is played by American industry. The rules are simple. You select those companies in whom you have complete confidence and you buy their products.

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Booklets describing the use of Haynes Stellite and the Stelliting process will show you where you can use them in your business. They will gladly be sent on request.

HAYNES STELLITE COMPANY
Unit of Union Carbide and Carbon Corporation
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District Sales Offices: Carbide and Carbon Building, 30 East 42d Street, New York; Peoples Gas Building, Chicago; Keith Building, Cleveland; General Motors Building, Detroit; 114 Sansome Street, San Francisco; 1310 Santee Street, Los Angeles.

Excerpt from first advertisement in 1927

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Yet, after all, there is nothing mysterious about it. Our trump cards were Quality, Uniformity, Service and Fair Dealing. There are no aces up the sleeve in the kind of confidence game we are talking about. All cards are on the table and everybody wins.

We enjoyed playing the game with our customers last year. We intend playing the same game this year in the same way.

Plan to join us in 1928. Our present customers will tell you how successfully the new kind of confidence game is played.

HAYNES STELLITE COMPANY
Unit of Union Carbide and Carbon Corporation

UCC

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Cleveland—*628 Keith Building*
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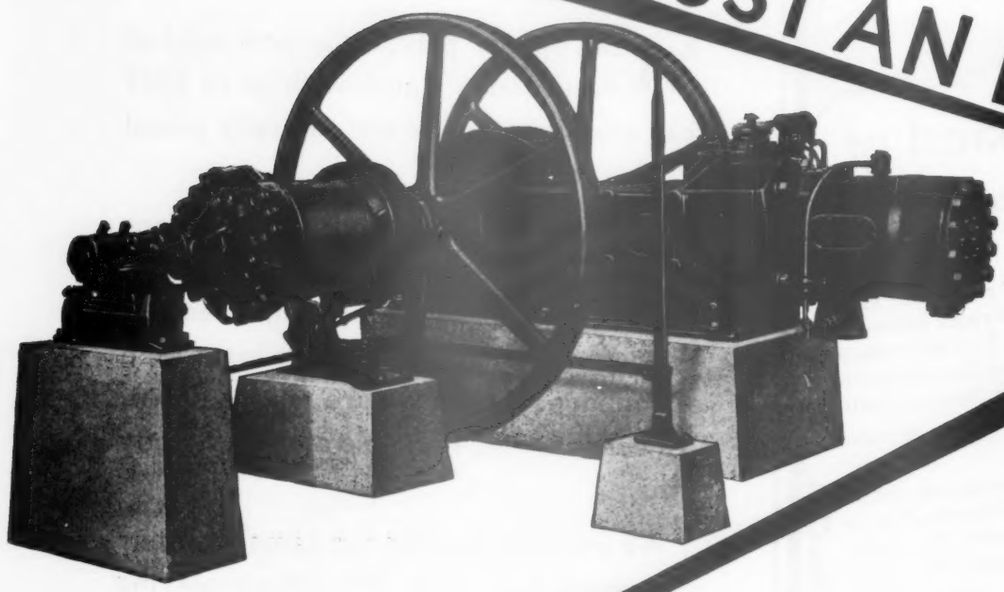
MORE THAN JUST AN ENGINE



THE Bessemer Oil Field Engine is not merely a gas engine—it is a perfected power plant developed and built exclusively for oil country service. Feature by feature this Oil Field power source has been engineered and fabricated specifically to meet the rigid service requirements of operation under every conceivable field condition.

It is entirely enclosed—yet all parts are quickly and easily accessible. All moving parts will wear for years, but adjustment has been provided on all parts subjected to hard wear so that their years of service are materially lengthened. They are overstrength—yet excessive weight has been avoided. Their simplicity means less maintenance cost, and their long, uninterrupted service means less depreciation and consequently a lower power cost per working hour.

Judged from any angle, the Bessemer Oil Field Engine is a super power-plant for oil country service—unmatched in performance, outstanding in economy and the leader in investment value.

Watch it in operation, examine it closely, then judge for yourself. Also built in the 4-Cycle Type.

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52 York Street ∴ ∴ ∴ ∴ Grove City, Pa.

BESSEMER

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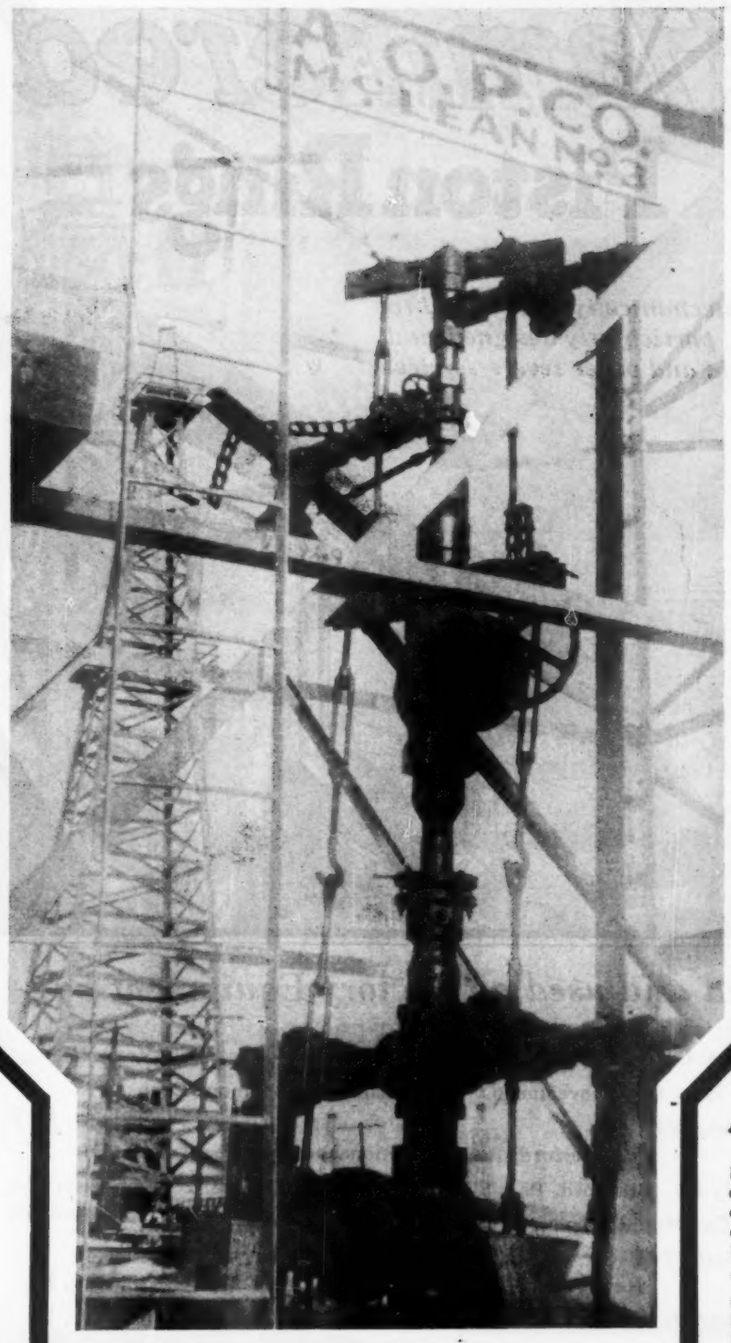

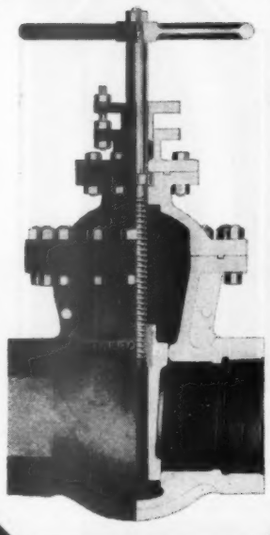

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A BIG CHRISTMAS TREE for TEXAS GUSHER

Here you see the outside evidence of the inside dependability of Kerotest Drilling Valves — showing a complete set of Kerotest Valves and Fittings installed on McLean No. 3.

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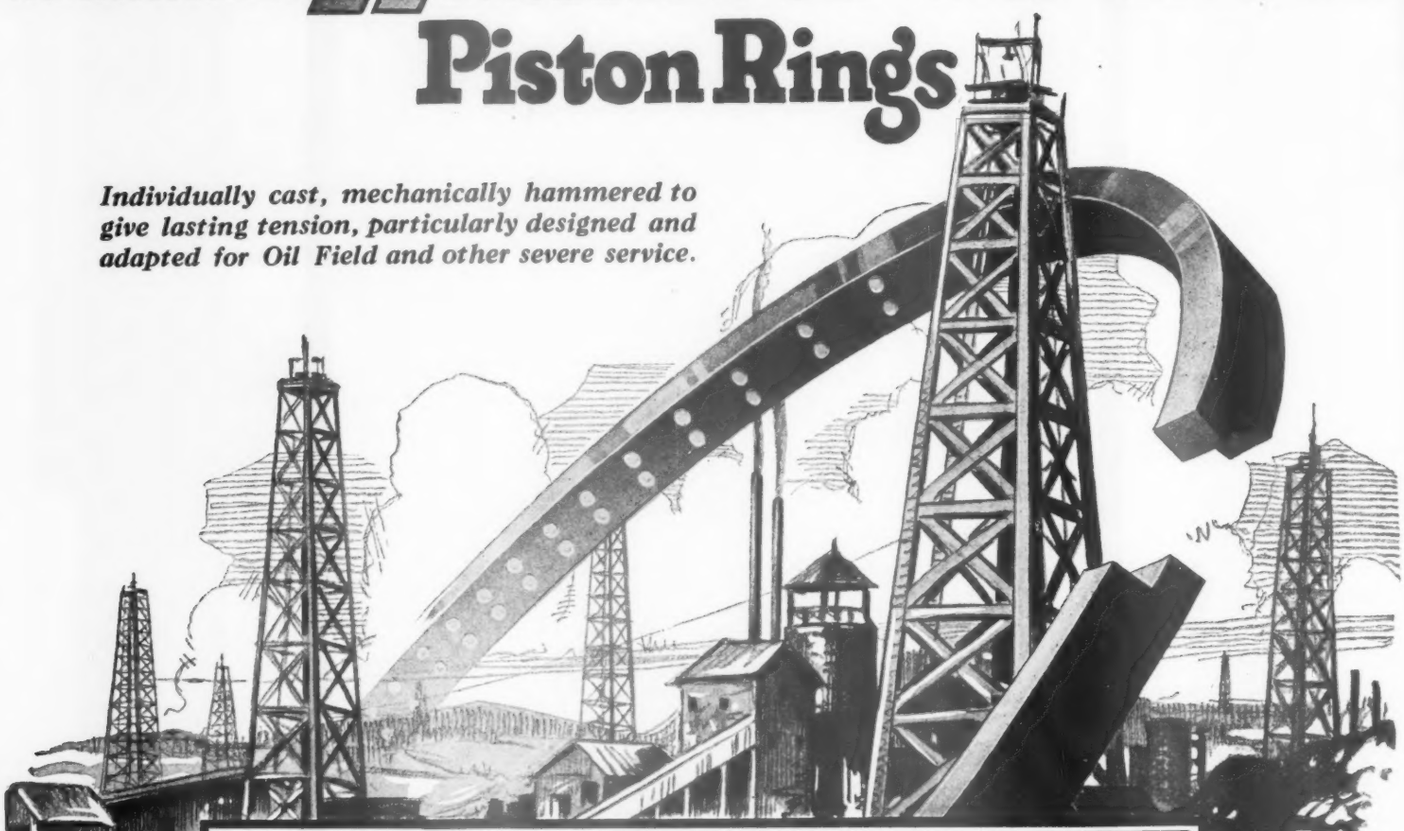
American Hammered Piston Rings

Individually cast, mechanically hammered to give lasting tension, particularly designed and adapted for Oil Field and other severe service.



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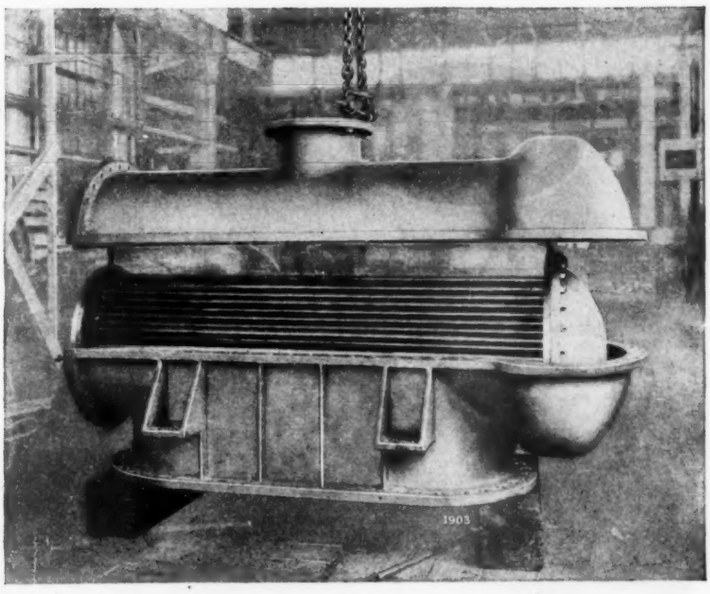
May be obtained from the above companies, or their selling agents, in standard sizes or oversizes.

Rings for any engine or compressor not listed above can be obtained direct from us.

The AMERICAN HAMMERED PISTON RING CO. BALTIMORE, MD.

Lift *the* Shell Cover



THE WHEELER Split Shell Heat Exchanger Construction (patent applied for) permits ready access to the tube bundle for inspection or repair.

No space is needed at the end of the shell for drawing the tube bundle as both shell cover and tubes are removable vertically. Ground space is saved and plant layout simplified.

The ready removability of the tube bundle makes it possible to shorten greatly the time out for repairs. One spare tube bundle may be carried for a battery of heat exchangers and inserted in any shell while repairs are made at leisure on the old tube bundle. The repaired bundle becomes, of course, the new spare.

The Split Shell Heat Exchanger is only one of many designs developed by the Foster Wheeler Corp. to meet exacting requirements. Other constructions for meeting individual requirements will be shown on request.

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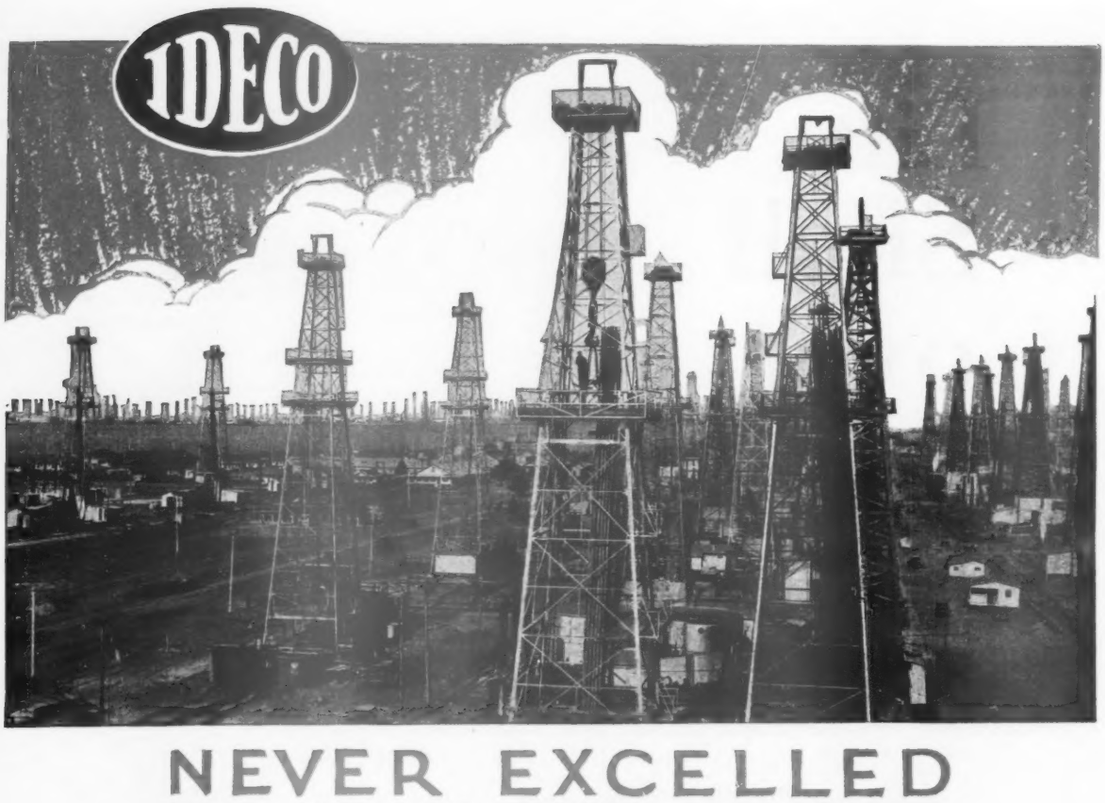
EXPANSION JOINTS FEED WATER HEATERS



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Price Increases Reflect Improvement

Highest daily average estimated total production in 1927, week ended July 30, 2,587,105 bbls. Lowest in 1927, Jan. 22, 2,360,789 bbls.

Declining Production of "Sweet Oils" With Increasing Demand for This Grade Make Higher Prices Logical

By Andrew M. Rowley

Highest daily average estimated light oil production in 1927, week ended July 30, 2,102,385 bbls. Lowest in 1927, Jan. 1, 1,790,729 bbls.

Increased prices for high gravity crude oils in the Mid-Continent area, including the Texas Panhandle, and in Southwest Texas, is the first tangible result of conditions which have marked a trend towards improvement in the industry during the past month. The decline in production of the grade of crude oil especially desirable for refining, generally called "sweet oil" to distinguish it from crude with a high sulphur content such as that produced in West Texas, with a continued big demand for this product, caused the major purchasing companies to readjust their price schedules to favor high gravity crude. It has been felt for some time the companies could not afford to take this high grade oil out of storage, as they have been doing, at prices then prevailing. With the demand increasing and the output of this type of oil decreasing, the price increase was a logical result. As it is believed this condition will continue until summer, further increases in high gravity oils in the near future would not be surprising.

The price increase is the first announced in the Mid-Continent area since May 15, 1926, indicating the industry senses a definite improvement over conditions which prevailed all of last year. While the amount of the advance in price is small, the psychological effect upon the industry undoubtedly will be reflected in a substantial increase in drilling operations in areas regarded as favorable and those most affected by the price increase this week.

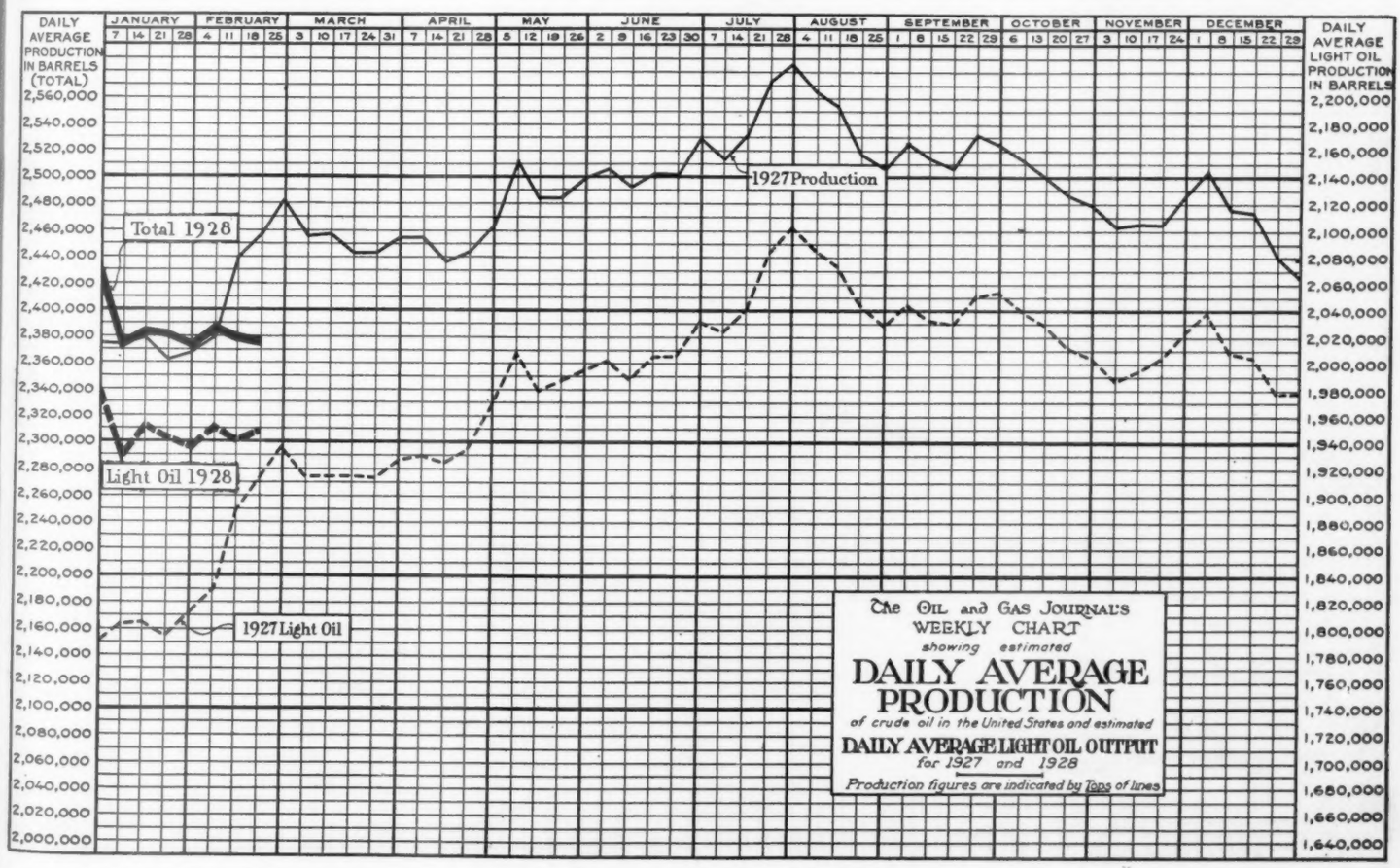
Of great importance to the general situation, also, are the movements being made now to curtail production of heavy gravity crudes until there is a greater demand for this grade of oil. Advices from California are to the effect a conservation program along these lines will be made effective there shortly and will result in shutting in approximately 50,000 barrels daily of prodution. Operations in Venezuela may be restricted also and as this crude is being shipped to eastern refineries and delivered along the Atlantic Coast at from 70 to 75 cents a barrel, such action will provide a greater market for producers in different sections of this country.

PRODUCTION IN THE UNITED STATES

Estimated daily average production of light and heavy gravity oil in the United States for week ended February 18, and a comparison with the previous week follows:

	Feb. 18		Feb. 11	
	Light	Heavy	Light	Heavy
Oklahoma—				
Tonkawa	15,790	.....	15,335	.....
Burbank	43,265	.....	42,265	.....
Other Osage Fields	29,580	.....	29,540	.....
Cushing and Shamrock	20,920	.....	20,965	.....
Bristow and Eastern Bristow	24,885	.....	24,530	.....
Cromwell	10,320	.....	10,390	.....
Garber	9,895	.....	9,915	.....
Blackwell-Braman	8,690	.....	8,745	.....
Seminole	318,740	.....	323,695	.....
Wewoka	8,420	.....	8,170	.....
Northern Miscellaneous	117,245	.....	116,695	.....
Southern Fields	60,565	.....	60,410	.....
Total Oklahoma	668,315	.....	670,655	.....
North Louisiana	37,385	7,950	37,625	8,000
Arkansas	20,275	67,965	20,215	68,355
North Central Texas	127,286	.....	125,663	.....
West Texas	299,250	.....	288,451	.....
Texas Panhandle	77,855	.....	79,915	.....
East Central Texas	25,262	.....	25,707	.....
Kansas	109,885	.....	109,760	.....
Total Mid-Continent Area	1,365,513	75,915	1,357,991	76,355
Gulf Coast	.....	112,864	.....	121,801
Southwest Texas	.....	26,677	.....	26,677
Eastern	107,000	.....	108,500	.....
Rocky Mountain Area	74,739	.....	74,331	.....
California—				
Santa Fe Springs	38,500	.....	38,500	.....
Long Beach	118,500	.....	118,000	.....
Torrance	2,750	17,000	2,750	17,000
Huntington Beach	59,000	.....	59,000	.....
Dominguez	12,750	.....	12,750	.....
Rosecrans	7,750	.....	7,750	.....
Inglewood	19,000	12,000	19,250	12,000
Ventura Avenue	53,000	.....	52,000	.....
Seal Beach	39,000	.....	40,500	.....
Remainder of State	52,000	185,500	52,000	185,000
Total California	402,250	214,500	402,500	214,000
Total United States	1,949,502	429,956	1,943,322	438,833
Grand Total	2,379,458		2,382,155	

→ **Total Decrease, 2,697 Bbls.; Light Oil Increase, 6,180 Bbls.** ←



Advance in Crudes Aids Gasoline

Boost in Schedules for High-Gravity Grades Tends to Strengthen Refinery Market. Kerosenes and Distillates Slow

By W. T. Ziegenhain

While the gradual strengthening of the Oklahoma refined oil market has been apparent for the past three weeks, shipments were being made at a relatively slow rate during the past few days and the stability of the higher prices was questioned. Confidence was renewed as higher prices were posted on the high gravity Mid-Continent crudes by the Carter Oil Co. and then followed by the Prairie Oil & Gas Co. and others on Tuesday.

Gasoline was generally sold at last week's prices, but there is promise of an immediate advance in keeping with the higher crude prices. The balance of the refined oil market will probably be little changed, for in posting the new crude prices the 36-36.9 gravity crude remains the same, the crude higher than 36 gravity takes a 3-cent higher price per degree in gravity, but the crude below 36 gravity is lowered 5 cents per degree of gravity, with 76 cents set as the flat price for all oil below 25 gravity. As examples of the effect of this change the 40-40.9 gravity oil is now posted at $1.40 per barrel, the old price being $1.36. The 30-30.9 gravity oil is now posted at $1.06, its old price being $1.16.

This change is in keeping with the relative refining values of the different crudes but in effect will tend to strengthen gasoline and hold fuel prices at their present level or even lower them.

Kerosene has showed no tendency to advance with gasoline over the past two weeks, even though refiners feel sure higher prices will result as the spring season opens. At present there is little demand other than an occasional export order and with production increasing as less furnace oil is made there is plenty of stock available and prices will probably show but little change over the next few weeks.

Higher March Market

Natural gasolines show very little change. The demand is normal with no increase expected over the last half of the month. Manufacturers are optimistic regarding the market for March, and while more than a week remains before March opens, inquiries are coming in. Some manufacturers feel certain that a decided drop in natural gasoline production in the Seminole Field will be felt during March which will further strengthen the market, but the history of production in that field to date has been that production has exceeded most estimates.

Fuel Oil Situation

Gas oils and fuel oils have shown greater strength but with the posting of the lower crude prices on the heavy crudes, the fuel price is not expected to advance further. Reductions in the fuel prices in other refinery centers, particularly those along the Atlantic Coast have not improved conditions in the general market and the better feeling which has prevailed in the Oklahoma market over the past week has been brought about by the removal of several refiners from the market rather than any increase in demand. If refiners running the heavy crudes forfeit a portion of the advantage gained through the posting of lower crude prices by reducing their fuel quotations a reversal of the market will follow and this might come about as the winter season comes to a close.

The optimistic factors in the fuel market are that no change will result in the average prices paid by the railroads on contracts since most of these contracts are based on the price of the 36 gravity crude which did not change and also the fact that the cracking value of these fuels is enhanced by the increased gasoline prices and refiners will push their cracking operations to utilize a maximum of this low priced cracking stock. Gas oil is

(Continued on Page 189)

REFINED MARKET BAROMETER

Scattered improvement in the refined oil market resulted from the higher prices posted on Mid-Continent high-gravity crudes. Gasoline prices have slowly advanced over the last two weeks in several areas, evidencing the better feeling, and it is probable that additional increases will result over the immediate future. This strengthening was not apparent at the Atlantic Coast refining points and in California, where gasoline is plentiful and is being freely offered. Fuel oils have also shown firmness in all sections, despite the lower prices posted on Mid-Continent low-gravity crudes. California refiners are not willing to sell fuel for shipment to the Atlantic seaboard in competition with the West Texas oils, and as a result the general fuel market is improved. The balance of the oils have not changed, but a general advance may follow later.

Mid-Continent—The posting of higher prices on the high-gravity Mid-Continent crudes renewed optimism in the gasoline market, and prices continued to advance. Fuel oils were stronger, also. Natural gasolines showed little change, as the demand only took care of the spot offerings, but better prices are predicted in the immediate future.

Atlantic Seaboard—Gasoline remained plentiful, while no price changes resulted. Optimism for the future of this market is shown as a result of the increased prices posted on the high-gravity Mid-Continent crudes. Fuels are improved, but lower prices are posted on gas oil.

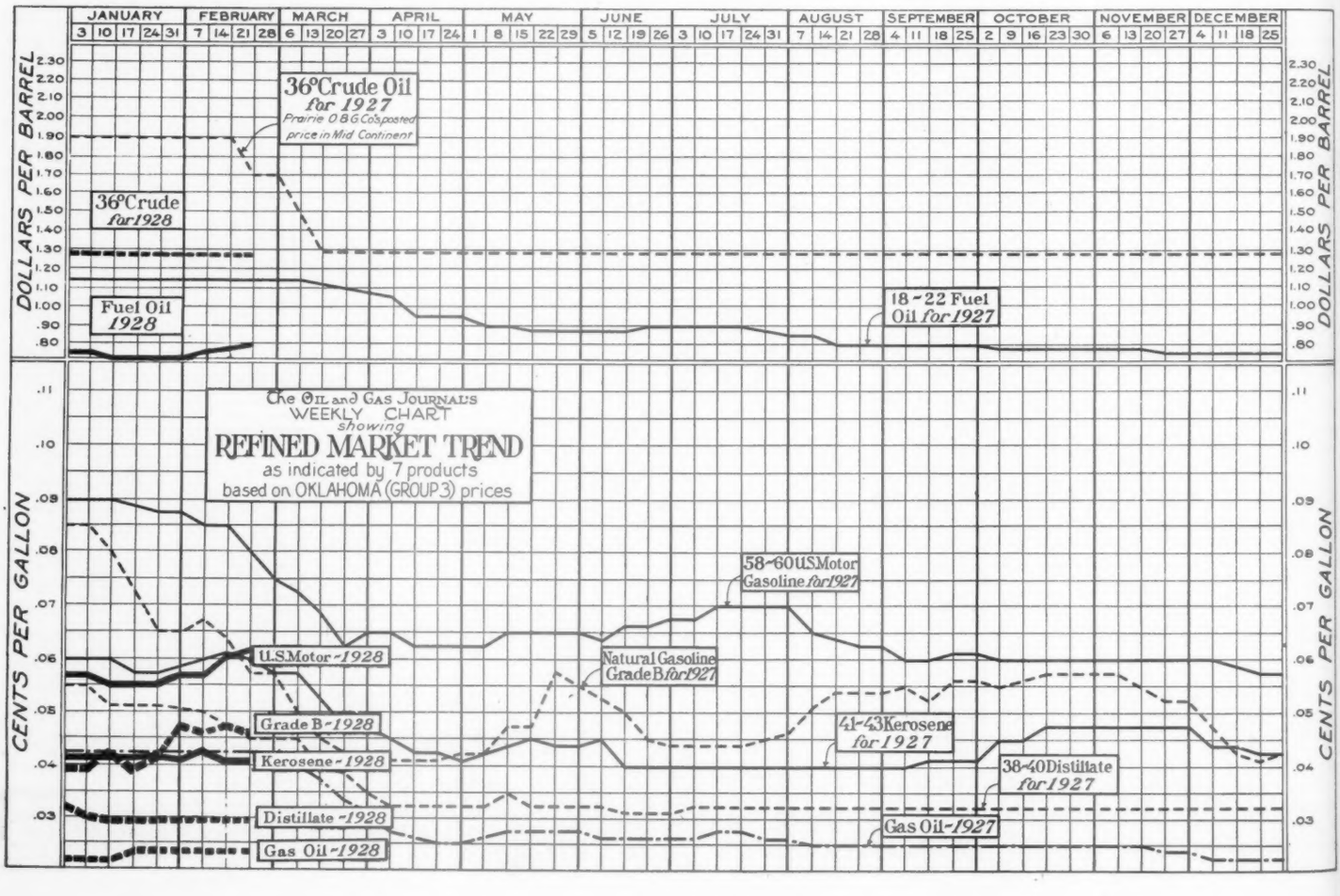
Chicago—Renewed activity resulted from the increased crude prices posted in the Mid-Continent, but prior to that the market was slow.

Shreveport—Gasoline strengthened as the demand improved, and many refiners are operating with but a small margin of stocks. The balance of the oils developed only minor changes during the week.

Pennsylvania—Oil products sluggish. Prices unchanged.

California—Gasoline and fuel oil are plentiful, but refiners refuse to lower prices to move it. Natural gasolines continue weak.

Houston—More favorable conditions prevailed in the Gulf Coast market. Lubricants were being quoted at slightly higher prices in some cases, and while the general market has shown no advance it is considered to be in a good position to do so in the immediate future.



Model Unit Operation Plan Proposed

Unincorporated Trust Suggested as Method. Judge Beaty Says It Is Time Oil Industry Ceased Running From Shadows

By AMOS L. BEATY

There was never much doubt about the desirability of agreements for the operation of oil pools as units. It was involuntary unit operation that became the subject of more or less heated argument. The proposition was that laws should be enacted to prevent any and every kind except unit operation. This was challenged on various fundamental grounds, which need not be recounted here, with the result that the industry became virtually unanimous in its opposition to the involuntary or enforced scheme, just as it earnestly supports the opposite plan of voluntary unit operation, and the recent report of the Committee of Nine completely sustains this position.

It is immaterial where the credit belongs, if indeed there has been done anything which warrants a credit entry, but if voluntary unit operation becomes a practice not all of the credit will be due those who believed the voluntary course impossible and clamored for coercion. At the same time it should not be forgotten that the advantages of unit operation, voluntary or involuntary, formed a part of the case they were trying to establish, and in striving for an impossible end they made important contributions to something which is not impossible, namely, voluntary unit operation.

It is to be expected that practical difficulties will be encountered in making agreements. In almost every oil pool there are numerous ownerships. It is no easy matter to bring all of them into complete co-operation. Moreover, producers may work in harmony today and pull apart tomorrow. For that reason agreements when made should be of a kind that will endure.

Consolidation in Corporation

One plan that immediately suggests itself is a consolidation of the various holdings into a single ownership. A corporation could be formed to acquire the properties in the pool area, those contributing the properties to receive stock of the corporation in return, on the basis of agreed valuations, and there could be a stipulation giving stockholders the preference right at equal prices and in proportion to their stock holdings from time to time to purchase oil from the properties.

But such incorporation, while ideal, may not be susceptible of accomplishment as a practical matter, because in the early life of a pool there can be no very satisfactory determination of values. The owner of each lease has a good opinion of his property and the task of bringing about an agreement on values would be difficult, if not hopeless. Moreover, it might not be conducive to harmony and future operations under such plans if a lease of merely prospective nature, turned in at a low price, should later prove to be immensely valuable. The machinery of corporations is such, governed by statutes as they are, that it would be difficult to work out just results in such cases. Corporations cannot take property in payment for stock and leave the value open for future determination. Nor can they very well revise and adjust from time to time the value of property received and the amount of stock issued in return. However, there is a way to accomplish the same result, and that is through an unincorporated trust, following closely in most respects the practice of corporations. Under that method the final valuation of the properties is deferred until the time arrives for final distribution of the avails, while in the meantime there are tentative valuations for purpose of vote or management and interim distributions.

As one of the first objections to these plans it may be said that they deprive the owner of his dominion and lodge everything in the corporation or the trustees. While that is true, a compensating feature is the strength of the arrangement. No welshing is left possible. The owner exchanges his land or lease for a certificate evidencing his interest in the pool. Such certificate should have full value on the market or as security for credit. The plan may be rather heroic, but conditions call for heroic action.

Legality of Agreements

The Committee of Nine recommends the passage of enactments making clear the legality of agreements for unit operation, at the same time expressing the opinion that they do not violate existing law. When the matter of obtaining legislative approval of curtailment agreements was presented to the American Petroleum Institute somewhat over a year ago it was not thought that agreements for unit operation required anything of the kind; hence they were not embraced in the resolution. Of course, the legislation would not be unwelcome, but if the state legislatures fail to pass it the industry should not hesitate. The real purpose of such agreements is the protection of private property, not the restraint of trade. Among the things accomplished are the orderly and economical production of oil, the prevention of unwarranted drainage and waste, the conservation of natural gas and its application to its most useful purpose in the production of oil, and in general a wise and essential protection of properties and values. Only incidentally and in a remote degree is commerce restrained. Such restraint, or tendency towards restraint, is no more than is to be found in hundreds of daily transactions in the course of regular and legitimate business.

Rule of Reason

Texas doubtless has the most extreme anti-trust law of any state in the Union, so far as wording is concerned, and it may be said in strict construction that the pooling of interests in oil production, even when limited to a single structure, is prohibited. But no such construction is allowable. So far as a statute has a meaning of that kind it must be condemned as unconstitutional. This doctrine was ruled by the Supreme Court of the United States in the Standard Oil dissolution suit. The court said, in effect, that although the Sherman Act in terms prohibited every combination which restrained interstate commerce, it could not be given a literal meaning and thus prohibit such combinations as were not vicious or unreasonable in their nature, because in that case it would unreasonably restrict the right to contract, and would unreasonably operate upon the right to acquire and hold property. The law was sustained and applied in that proceeding because of the rule of reason. Or, to put it another way, except for the rule of reason the Sherman Act did invade the right to contract and the right to acquire and hold property, but, with the rule of reason read in, it had no such effect and therefore was valid and enforceable. Only the fact that the strict and literal construction was unnecessary saved the act from condemnation. And precisely the same constitutional limitations apply to state legislation. If a statute of Texas or any other state is susceptible of a construction which would preclude a combination for unit operation, it is, to that extent and in consequence of that very fact, unconstitutional and void.

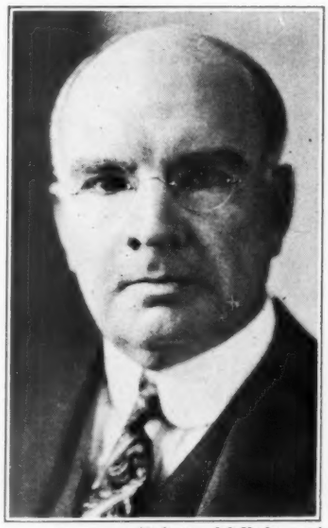
Cease Running From Shadows

It is time we ceased running from shadows. The industry should take its stand and refuse to be moved. No one should decline to go into unit operation if the basis is fair and the arrangement workable. To be sure, there are difficulties of a practical nature; the royalty interests must be thought of; and there are the express and implied drilling obligations. And then, too, in most cases there will be tracts of land the owners or lessees of which decline to come in. But, even so, much benefit may be expected if the working interests for the greater portion of a structure in somewhat solid block can be induced to join. In that event the outstanding interests, whether royalty alone or royalty and working interests, can be dealt with according to the rights of the various parties affected. There may be some drilling obligations and certain amount of line protection that cannot be deferred, or which it is not desirable to defer, but after all there should remain very substantial advantages in near unit operation.

Oil is in a new era. For the first time in its history there seems to be an opportunity to have proven reserves. It is more than an opportunity; it is a necessity. If the new pools are not thus treated, but are plundered and despoiled and the products dumped upon the market, the present depression in the industry may continue for years. We face that danger most certainly if the industry does not get hold of itself and keep that

A Constructive Suggestion

Judge Amos L. Beaty is recognized as one of the keenest minds in the oil industry and as an authority on the law relating to petroleum. He was chairman of the Committee on Co-operative Agreements, whose report on curtailment of overproduction was adopted by the Board of Directors of the American Petroleum Institute at the recent meeting in Chicago. In the accompanying article he takes up the matter of unit operation, which, he points out, is distinct from co-operation to relieve overproduction, and presents to the industry a plan by which unit operation may become possible without waiting for further legislation.



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AMOS L. BEATY

He relies upon the rule of reason read into the Sherman Act by the United States Supreme Court as authority for co-operation for legitimate ends and declares it is time the industry ceased running from shadows.

hold. Whether there is to be prosperity or continued disaster is for the industry itself to decide. It is not only possible to have proven reserves and draw upon them in a sane and orderly manner, but their existence would give the business more stability. The present large potentiality of proven fields should be an asset instead of a liability. Unit operation is not a cure-all, but it will help greatly. Curtailment agreements will be most useful at times. They are to be distinguished from unit operation. In practice as well as in law they represent an entirely different thought. Legislation is needed to remove doubts here and there touching their legality. But far from being immoral they are quite ethical, and whether legislation is obtained or not oil producers should rise to the occasion when curtailment is necessary.

But back to unit operation, and in conclusion: Below is the plan which would accomplish the desired result in cases where incorporation is not desirable or practicable. Its adoption in any instance will require real sportsmanship in those who think they have an advantage or who would prefer to keep their properties intact in order to operate or sell them as they see fit rather than occupy the position of shareholders in a trust. And yet it may be worth the price as tending to bring order out of chaos for the benefit of one and all. If not worthy of adoption now it may become so in a few months.

The Plan

1. Three or five trustees are selected, and they sign a trust agreement embodying the terms of this plan, with suitable details and elaboration. Properties in the pool area are then transferred to the trustees, under the terms and conditions of the trust agreement, and the transferers receive from the trustees duly signed certificates stating that they have made such transfers and have become shareholders in the trust. Thenceforth all operations and business in connection with the properties included in the trust are carried on by the trustees, subject to the direction and control of the shareholders, exercised in accordance with this plan and the trust agreement.

2. Shareholders meet at fixed times and places. Special meetings also may be held as provided. At all meetings shareholders vote in person or by such representatives as they may designate for that purpose. And, except as otherwise provided in this plan or the trust agreement, shareholders reach decisions by major value vote, meaning that on any question where there is a division the side having for its support shareholders whose property contributed to the trust estate has at the time of such vote the greater value, shall prevail.

3. The trust agreement does not become effective until the shareholders select three or five appraisers who will undertake to serve and whose duty is to fix, by unanimous or majority action, the values of properties from time to time and also the voting strength of shareholders, based upon such vales, and in like manner to change and readjust such voting strength as values change or properties are divided or transferred. Decisions of the appraisers are binding and conclusive, and any shareholder may require a ruling by the appraisers whenever a question of values or voting strength arises.

4. The trustees keep all leases in force, if this can be done in the exercise of reasonable diligence, except as to lands proven barren of oil and gas, as may be determined at meetings of the shareholders.

5. Shareholders at their meetings may levy assessments for development purposes, on the basis of values at the time of such levy of the properties contributed by shareholders respectively, and when warranted by net earnings and cash on hand they may declare and order paid interim dividends prior to the termination of the trust, such payments to be on the basis of the value to the trust estate, as seen at the time of such interim distribution, of the property and money contributed by the respective shareholders, but care must be taken to avoid payments which subsequent events might prove to be excessive.

Termination of the Trust

6. At the termination of the trust the net avails are distributed so that each shareholder receives (counting interim and final dividends) his fair and equitable proportion of such avails, based upon the relative value to the trust estate, as finally ascertained, of the property and money contributed by him. In the determination of such value effect is given to advantages resulting from the early production and pull which would have been enjoyed by any shareholder but for the agreement, and proper adjustment is made to compensate for drainage suffered by any property in the trust if such drainage has resulted from the agreement and would not have been permitted in its absence. If the shareholders fail to agree the appraisers fix the final proportions and amounts.

7. Unless sooner dissolved, as herein provided, this trust continues in force so long as the properties produce oil or gas in paying quantities. But it may be dissolved at any time by a three-fourths value vote of the shareholders, and upon such dissolution lands and leases are reconveyed to the shareholders who contributed the same in the first instance or their assigns, subject to fair and equitable terms, charges and adjustments.

8. The interest of any shareholder may be assigned or transferred in whole or in part upon the books of the trustees, and the assignee or transferee to that extent succeeds to the rights and obligations of such original shareholder. Successive assignments or transfers may be made with like effect. The holder of an assigned or transferred interest or part interest is deemed a shareholder.

9. Any trustee or appraiser may be removed by the major value vote of the shareholders, and vacancies caused by death, resignation or removal of trustees or appraisers are filled at the earliest opportunity by the shareholders in like manner, to the end that there may be three (or five) acting trustees and three (or five) acting appraisers as continuously as may be practicable.

10. The compensation of trustees and appraisers is fixed by the shareholders, and such compensation and all reasonable and proper disbursements of trustees and appraisers are paid by the trustees and treated as expense.

11. Shareholders are given the preference right at equal prices to purchase oil or gas from the trust property in proportion to the value at the time to the trust estate of the properties and money contributed by them respectively.

New Seminole Plan Proposed

Territory to Be Tested by 12 or 14 Wells, Eliminating Offset Drilling. Maud Shut Down Extended

By J. L. Dwyer

At a meeting which was marked by exceptional harmony of thought the operators of the Greater Seminole Field voted to continue the existing shut down in all outlying regions of the area except that in Township 7-6, immediately south of the Little River Pool, for a period of 30 days after April 1, the date upon which the current shut-down plan expires.

There was a lengthy debate over the advisability of continuing the Little River shut down, with many favoring the extension of the plan which expires March 1. The general sentiment of the meeting was in favor of eliminating as far as possible any unnecessary drilling activity, and towards this end, a plan which is novel and unique was offered for the consideration of the operating companies. It was evolved by R. B. Pringle, vice president of the Independent Oil & Gas Co., who is a member of the Seminole advisory committee.

The plan calls for the drilling of 12 or 14 test wells scattered over Township 7-6 in regions which seem to have the greatest promise of producing oil. It is the provision of the plan to have one well in each promising region drilled, and to have the owners of leases adjacent to the well pay dry-hole contributions to the company doing the drilling. In the event that a producing well is discovered the owner of the well is required to shut in its production to 100 bbls. daily, until such time as the contributors have drilled their wells to a depth equal to the producing well.

New Production Postponed

An outstanding feature of the meeting is, that under the plan for Township 7-6, it will be September 1 before any flood of oil can be thrown on the market. Providing that the test wells are started around March 1, using average drilling time, it will be June 1 before they reach the sand, and then the offset wells will be started with the result that it will be September 1 before they reach the sand.

Under the plan for other outside regions if the shut down is continued until May 1, average drilling time will make it August 1 before any batch of wells will be completed.

This plan, if adopted, will eliminate 100 wells which otherwise will be started when the Little River shut-down agreement expires on March 1. While no vote on its adoption was taken, the majority of operators interested in the area seemed heartily in favor of its acceptance, and it remains for the umpire and the advisory committee to arrange the details regarding the location of the test wells, and the operating regulations incidental to the working of this plan. It is easily understood why the operating companies would be in favor of this plan of operation, for if they owned a lease across the line from one of the test wells, they would be called upon for a dry-hole contribution of $10,000 or possibly $15,000. Should the well be a failure, the contributors would be saved the difference between their contribution and the cost of completing a well on their own lease. Should they operate under the old plan, and every test well be offset by the adjoining leaseowners, and all wells be dry, the loss would be appreciably more. Should the test well be a producer, the company owning the offset lease would be released from the obligation to contribute dry-hole money, and would be permitted to start its well immediately.

Plan Regarded Favorably

The plan drew numerous favorable comments, and seems logical, practical and economical. It was designed primarily to limit drilling activity in this area which is admitted by all who have studied it, to be extremely treacherous in producing potentialities. If Little River and the remainder of Township 7-6 should be thrown wide open to the drill upon the expiration of the current shut down plan, there would be at least 120 wells started.

As a matter of protection, the companies owning leases in this region have already placed on the ground some 60 derricks, which will not be erected if the Pringle plan is adopted. The advisory committee and the umpire granted permission to these companies to move in their rigs in order to guard against any trouble accruing from the rainy season and its effect upon the Little River roads which are not very good at their best.

One important factor which had a wide influence in helping to eliminate the possibility of extra drilling was the eccentric nature of some of the wells which have been drilled in Township 7-6. There have been two distinct disappointments in this area, the greatest being the test of the Barnsdall Oil Co. on the Hotulka farm in Section 22. This well was reported to be running very high structurally, and when it found the Wilcox sand with a hole full of water, it put a damper on drilling work which could not otherwise have been checked. Previously to the failure of this well, it was believed that the Little River Pool would extend from the limits of production which at that time were around Section 2-7-6, all the way down through the township to the Barnsdall well. The Mid-Continent Petroleum Corp. also drilled a Wilcox sand failure in Section 32-7-6, which added to the desire of the operating companies to go slowly in their drilling work in this area, and the failure of these wells did much to hold the field in check.

The Independent Oil & Gas Co., which in partnership with the Highway Oil Co. owns a lease which has one producing well, has made certain contractual obligations which call for additional drilling. This drilling has been postponed from time to time, and the Independent company is reported to have no alternative except carry out its contracts at this time, or face lawsuits.

There are two other instances of producing companies who have shut in their wells in this field facing lawsuits over their failure to pursue drilling, but these suits come from royalty owners who are demanding that the drill be put to work on their property.

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Big Drop in High Grade Oil Production

Daily Production of "Sweet" Oils Has Fallen Off 252,316 Bbls. Daily in Six Months and 47,878 Bbls. in One Year

By James McIntyre

Increases in the price of the higher grades of Mid-Continent oil, effective on Tuesday, February 21, were considered quite in line with conditions in the high grade oil market. The fact that minor reductions were made in oils from 30 to 35 gravity, inclusive, did not set so well with producers, but it only emphasized the fact that there is a present shortage of "sweet" oils above 36 gravity for which there is a very keen demand.

Previous cuts in the crude market prices in Lima, Ind.; Cabell, W. Va.; Somerset, Ky.; Sunburst, Mont.; Cotton Valley, La.; Smackover, Ark., and more recently the cut in crudes below 32 degrees in gravity in Kansas, Oklahoma and Texas by the Magnolia Petroleum Co. were not regarded seriously, nor were they understood by oil men who watch the trend of production.

Production has fallen 180,576 bbls. a day within six months and the production of oil in the first week in Feburary this year is only 10,501 bbls. a day higher than it was in the first week of Feburary last year. In the past six months there has been a decline of 252,316 bbls. a day in the production of those desirable high grade crudes which have been labeled "sweet" oils to distinguish them from the sulphur-laden, corrosive oils which have become known as "sour" oils. Even compared with the production of a year ago there is a decline of 47,878 bbls. in the production of the higher grade, or "sweet" oils.

Extreme Changes in Production

A study of production now and at critical times in the recent past is interesting. Many surprising ups and downs are to be found when the production of different areas now is compared to that of six months ago, a year ago and 15 months past. Big increases in one area are met by big declines in other areas. The drop in the production of light oil since August 1, 1927, has been as sensational as the increase in production in the first half of last year. Comparing the production of the first week in February, 1928, with that of the first week in August, 1927, we find the following decreases in the average daily production of the lighter and better grades of oil: In Oklahoma, 209,005 bbls.; North Louisiana, 10,630 bbls.; Arkansas, 1,630 bbls.; North Central Texas, 25,433 bbls.; East Central Texas, 6,754 bbls.; eastern fields, 1,500 bbls.; Rocky Mountain fields, 7,029 bbls. and increases only in Kansas, 4,615 bbls. and California 5,050 bbls. In the matter of heavy oils and so-called "sour" oils we find an increase only in one division, West Texas, 147,012 bbls., while declines are noted as follows: North Louisiana, 1,450 bbls.; Arkansas, 14,835 bbls.; Texas Panhandle, 24,580 bbls.; Southwest Texas, 5,371 bbls.; Gulf Coastal fields, 25,536 bbls.; California, 3,500 bbls.

In all the producing divisions in the United States only West Texas and, in a small way, California and Kansas, show any increase as compared with six months ago.

Going back a year, or to the first week in February, 1927, it is seen that only Oklahoma and the Eastern fields are now producing more light oil and only West Texas is producing more of lower grade oil.

Compared with a year ago, Oklahoma shows an increase of 30,000 bbls. a day and the eastern fields 2,750 bbls., while average daily production declines are noted as follows: North Louisiana, 3,065 bbls.; Arkansas, 5,975 bbls.; North Central Texas, 39,648 bbls.; East Central Texas, 20,148 bbls.; Kansas, 4,955 bbls.; Rocky Mountain fields, 3,087 bbls.; and California, 3,750 bbls. While West Texas has increased 221,732 bbls. as compared to a year ago, declines are noted in other fields as follows: North Louisiana, 4,790 bbls.; Arkansas, 31,760 bbls.; Texas Panhandle, 48,028 bbls.; Southwest Texas, 12,551 bbls.; Gulf Coast, 39,724 bbls. and California, 26,500 bbls.

Big Drop Since July 30

As stated before, the total production in the United States of high grade and so-called "sweet" oils has declined 252,316 bbls. daily in six months. In the same period the total production of heavy oils and so-called "sour" oils has increased 71,740 bbls. The net decrease in the production of all oils has been 180,576 bbls.

The daily average for the week ending February 4, 1928, and the week ending August 6, 1927, are used for comparative purposes. The peak production week was the seven days ending with July 30, when the average was 2,587,105 bbls. per day, and the peak for one day, on July 30, was very close to 2,600,000 bbls. of which 1,868,396 bbls. came under the classification of "sweet" oil. The production of "sweet" oil at this writing has fallen 284,000 bbls. a day since July 30.

The fact that the production of higher grade crudes has dropped over a quarter of a million barrels in six months is really not as impressive as the fact that the production now is 47,878 bbls. a day below the figures of a year ago, when production was not considered abnormal and when the trouble lay not in the oil the industry had but in what it knew it was to get in the months to come. The price of 36 gravity crude oil in the Mid-Continent a year ago was $1.90 per barrel, which was the price at the opening of the year, and it was not until February 22 that it fell to $1.67 per barrel. It was

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Daily Average Production of Light and "Sweet" Oils for weeks Ending February 5, 1927, and February 4, 1928

	Daily Av. Feb. 5, 1927 Bbls.	Daily Av. Feb. 4, 1928 Bbls.	Decrease or Increase Bbls.	
Oklahoma	637,710	667,710	30,000	Increase
North Louisiana	40,275	37,210	3,065	Decrease
Arkansas	26,970	20,995	5,975	Decrease
North Central Texas	169,650	130,002	39,648	Decrease
East Central Texas	46,006	25,858	20,148	Decrease
Kansas	115,540	110,585	4,955	Decrease
Eastern Fields	107,250	110,000	2,750	Increase
Rocky Mountain Fields	82,624	79,537	3,087	Decrease
California	406,000	402,250	3,750	Decrease
Total	1,632,025	1,584,147	47,878	Decrease

Decrease in light and "sweet" oils, 47,878 bbls.

Daily Average Production of Heavy and "Sour" Oils for Weeks Ending February 5, 1927, and February 4, 1928

	Daily Av. Feb. 5, 1927 Bbls.	Daily Av. Feb. 4, 1928 Bbls.	Decrease or Increase Bbls.	
North Louisiana	12,970	8,180	4,790	Decrease
Arkansas	100,925	69,165	31,760	Decrease
Texas Panhandle	128,633	80,605	48,028	Decrease
West Texas	67,105	288,837	221,732	Increase
Southwest Texas	39,165	26,614	12,551	Decrease
Gulf Coast	157,285	117,561	39,724	Decrease
California	239,500	213,000	26,500	Decrease
Total	745,583	803,962	58,379	Increase

Increase in heavy and "sour" oils, 58,379 bbls.
Net increase in production of all oils, 10,501 bbls.

Daily Average Production of Light and "Sweet" Oils for Weeks Ending August 6, 1927, and February 4, 1928

	Daily Av. Aug. 6, 1927 Bbls.	Daily Av. Feb. 4, 1928 Bbls.	Decrease or Increase Bbls.	
Oklahoma	876,715	667,710	209,005	Decrease
North Louisiana	47,840	37,210	10,630	Decrease
Arkansas	22,625	20,995	1,630	Decrease
North Central Texas	155,435	130,002	25,433	Decrease
East Central Texas	32,612	25,858	6,754	Decrease
Kansas	105,970	110,585	4,615	Increase
Eastern Fields	111,500	110,000	1,500	Decrease
Rocky Mountain Fields	86,566	79,537	7,029	Decrease
California	397,200	402,250	5,050	Increase
Total	1,836,463	1,584,147	252,316	Decrease

Decrease in light and "sweet" oils 252,316 bbls.

Daily Average Production of Heavy Oil and "Sour" Oils for weeks Ending August 6, 1927, and February 4, 1928

	Daily Av. Aug. 6, 1927 Bbls.	Daily Av. Feb. 4, 1928 Bbls.	Decrease or Increase Bbls.	
North Louisiana	9,630	8,180	1,450	Decrease
Arkansas	84,000	69,165	14,835	Decrease
Texas Panhandle	105,185	80,605	24,580	Decrease
West Texas	141,825	288,837	147,012	Increase
Southwest Texas	31,985	26,614	5,371	Decrease
Gulf Coast	143,097	117,561	25,536	Decrease
California	216,500	213,000	3,500	Decrease
Total	732,222	803,962	71,740	Increase

Increase in heavy oils and "sour" oils, 71,740 bbls.
Net decrease in production of all oils, 180,576 bbls.

Daily Average Production of Light and "Sweet" Oils for Weeks Ending October 30, 1926, and February 4, 1928

	Daily Av. Oct. 30, 1926 Bbls.	Daily Av. Feb. 4, 1928 Bbls.	Decrease or Increase Bbls.	
Oklahoma	539,650	667,710	128,060	Increase
North Louisiana	43,955	37,210	6,745	Decrease
Arkansas	31,355	20,995	10,360	Decrease
North Central Texas	151,980	130,002	21,978	Decrease
East Central Texas	56,730	25,858	30,872	Decrease
Kansas	114,715	110,585	4,130	Decrease
Eastern Fields	108,650	110,000	1,350	Increase
Rocky Mountain Fields	101,485	79,537	21,948	Decrease
California	381,500	402,250	20,750	Increase
Total	1,530,020	1,584,147	54,127	Increase

Increase in light and "sweet" oils 54,127 bbls.

Daily Average Production of Heavy Oil and "Sour" Oils for Weeks Ending October 30, 1926, and February 4, 1928

	Daily Av. Oct. 30, 1926 Bbls.	Daily Av. Feb. 4, 1928 Bbls.	Decrease or Increase Bbls.	
North Louisiana	15,590	8,180	7,410	Decrease
Arkansas	116,675	69,165	47,510	Decrease
Texas Panhandle	157,645	80,605	77,040	Decrease
West Texas	51,194	288,837	237,643	Increase
Southwest Texas	43,080	26,614	16,466	Decrease
Gulf Coast	177,405	117,561	59,844	Decrease
California	248,500	213,000	35,500	Decrease
Total	810,089	803,962	6,127	Decrease

Decrease in heavy oils and "sour" oils, 6,127 bbls.
Net increase in production of all oils, 48,000 bbls.

Combating Corrosion in West Texas

Present and Potential Production From Limestone Pools in Vast Area Warrants Intensive Study by Companies and Engineers

By L. G. E. Bignell
Associate, American Institute Mining and Metallurgical Engineers.

The magnitude of the destruction caused by corrosion of iron and steel equipment handling oil and gas that is being produced from limestone formations in the Panhandle and West Texas areas is now becoming very apparent and the realization of the cost that this loss is adding to the other numerous items of expense in producing this sulphur oil is causing the producers, pipe line companies and refiners to seek diligently for preventive methods of combating this evil.

This article is prepared as a review of work done during the past three or four years upon corrosion problems with the hope that some of the suggestions offered will be found of assistance in this work of combating corrosion and can be applied to the various problems, but it will deal more particularly with those problems of handling the oil fresh from the well in lease storage tanks than with other phases.

The problem of handling sulphur oils is by no means a new one to the industry and during 1901, 1902 and 1903 when development was active in the south Texas fields of Batson, Saratoga and Sour Lake the oil gave much trouble when first produced, but the effects were noted most in the pipe lines and large 55,000-bbl. capacity steel tanks, for the fresh oil on the lease was handled through wooden tankage for this was before the days of bolted steel tanks.

However, trouble was experienced with the wooden tanks for the flat hoops used in their construction would become cor-

Under side of dome cover showing iron sulphide scale.

roded and reduced to such a thin cross section that they would break and release the oil from the tank.

Effect on Big Tanks

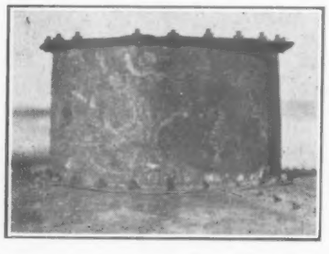
In the large steel tanks the effect of the corrosion was quite noticeable and failures were not uncommon. In discussing these conditions with men who were active in those old fields they tell interesting stories of iron sulphide scale glowing on the under side of hatch box covers when they were exposed to the air at night, and of phosphorescent glow in the gases as they escaped from the tanks.

In a paper read before the American Petroleum Institute at the Chicago meeting in December, 1927, Brain Mead of the Humble Oil & Refining Co. calls attention to this phenomenon and therefore the conditions cited above as observed in those tanks in the old South Texas fields indicates that this was hydrogen sulphide gas forming the destructive element there, just as it is now playing such an important part in this problem in West Texas areas.

In considering the conditions as they now exist in the limestone areas of West Texas it may be appropriate at this point to discuss the possible causes that contribute to this oil and gas having such highly destructive properties, as such a discussion may be of use in pointing out a way to the solution of the difficulties if something of the origin of the oil is understood.

Normal oils, known as "sweet oils" usually come from true sand deposits, the sands being either sea shore or river bed material and usually of a sharp siliceous nature, showing just as the similar type of sands do at this time on the earth's surface, evidence of being broken up from igneous rocks of the earlier geological periods and washed and polished by water actions and finally carried to their place of final deposition by this water, where they have been dropped due to change in stream current velocity or tide action, or both.

These sands are not considered the



Dome on storage tank in Colorado, Texas, Field, showing effects of corrosion.

source rock in which the oil-making material was deposited, for it is generally accepted that the organic matter, consisting of animal and vegetable remains dropping to the floor of the old seas and ponds was buried in the soft mud or ooze which was later consolidated into shales and the minute drops of oil migrated from those shales to the more porous strata of sand from which they are now being produced.

"Sweet Oils" Filtered

The original oil probably contained all of those products of decomposition of animal and vegetable matter but migration out of the shales to the sands under conditions of pressure and probably heat served to filter this material, so as now found in sand strata it is nearly free of those impurities.

All of the elements necessary to produce the above-described conditions for "sweet oils" have existed in the limestone areas, with these exceptions; the material at the bottom of the old seas and ponds was largely of a limestone character and the organic matter fell into it instead of the soft muds that were later consolidated into shales; the migration has therefore been from limestone sediments to porous places in the limestone that were of massive construction and therefore there was no opportunity for the filtration and purification of the oil drops by movement through different kinds of rock and soil as there has been in the other classes of deposition.

There is evidence to support this theory of movement from one character of rock to another being necessary for purification if the character of the oil and gas found in the granite wash area of Carson County, Panhandle district, Texas, is considered, along with the oil and gas found in the limestone immediately north of Carson County.

This granite wash from which oil has been produced since 1923 is merely the disintegrated granite that has been broken away from the buried granite ridge that is known to exist in this area, and is very similar to disintegrated granite found in the Wachita Mountains of Oklahoma, which are assumed to be an extension of the buried mass in Carson County and southeast from there.

Over this granite wash and ridge there has been deposited lime sediments which are oil bearing, and the ends of these limestone strata are open where they come in contact with the granite.

This provides conditions necessary to permit oil formed in the limestone to migrate to the granite wash and this oil has been produced and handled in ordinary equipment since 1923 and as yet no evidence of corrosion has been noted, but oils from the same horizon in the limestone areas north of Carson County have been noticeable for their sulphur contents and hydrogen sulphide gases that accompany them have been known to

View of tank bottom showing bolts destroyed as result of corrosion.

destroy steel lease tanks in about nine months time.

Contain Original Products

It therefore seems reasonably safe to assume that sulphur oils as produced from the limestones in Panhandle and West Texas are indigenous to those rocks and still contain a large proportion of the products of the reactions that took place when organic matter was decomposed at the bottom of the old Permian ponds and seas and has been sealed into the reservoirs along with this oil, and is now being released and brought to the

Deck sheet near dome of storage tank.

surface to make rapid combination with metals with which it comes in contact.

This theory is naturally open for discussion as there are other ways of accounting for the production of oil of this character, but it is recited here because it is felt that there is opportunity to do a great deal of work in this field right at the wells where the oil and its

SUGGESTIONS OFFERED BY MR. BIGNELL

In summing up conditions as they deal with lease tank storage the following suggestions are offered, not because it is felt that they are final answers to this intricate problem, but because field experience has thus far shown they are safe expedients to follow and even if they fail in individual cases they can do no harm.

Select equipment built from material of good quality.

Design equipment to eliminate as many tension strains in the metal as possible.

Select the metal with regard to its thickness, as the corrosion will be measured in inches of penetration per year.

Provide some means of keeping the interior of the tanks as cool as possible. Aluminum paint, water sealed tops and tank sheds will assist in this direction.

Check the oil as it comes from the well by fractionation test for its original contents and then sample and analyze the oil going to the pipe lines from open and tight storage and estimate whether the saving accomplished by tight storage justifies the accelerated rate of corrosion in the tanks that will follow closing them.

Have the tanks set in ample time to permit the painting of the inside thoroughly and carefully with a good protective coating, to insure against bare spots on the metal where corrosion could easily start.

When tanks are to be cleaned use every precaution to protect workmen, and one of the main essentials to such protection is allowing ample time between operations for reactions to take place before exposing the men to hazards.

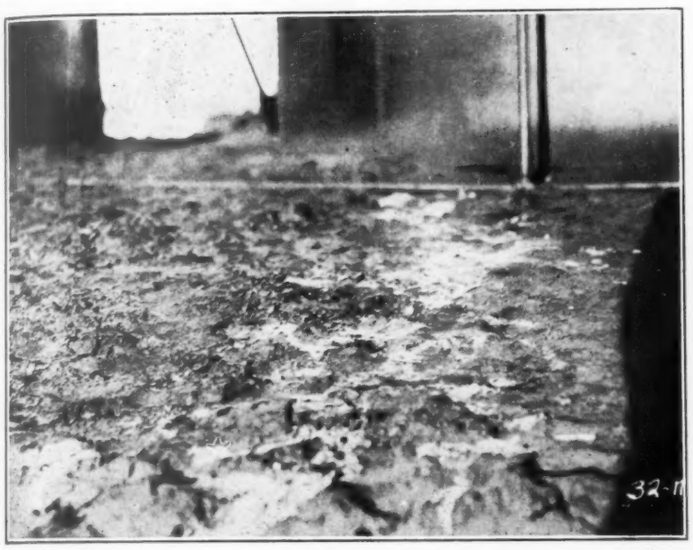
Treat this whole problem as one justifying the attention of carefully trained men, and place such men in charge of these operations with complete authority to act.

The possible future of production in the limestone areas of West Texas is of such magnitude as to warrant careful and co-ordinated research work by all concerned for it is felt that those pools now opened in that area are but the forerunners of numerous other limestone fields that will be found in that vast area "West of the Pecos and north of the Rio Grande."

accompanying gas and water can be handled quickly before there is opportunity for change to take place due to altered pressure and temperature, and until this work is done and made known to all interested, the chemist and metallurgist will be working under a handicap, for material gathered at the well and shipped to far eastern laboratories for analysis can undergo so many chemical changes that it will lack many of the essential elements in their original form when the samples reach destination.

It is known that samples of hydrogen sulphide gas shipped from wells in the Panhandle have failed to show even a trace of that gas when tested at the laboratory, while at the well it has been very evident by its odor.

Check on the manner of handling these samples developed the fact that they had been secured by using citrate of magnesia bottles, first filled with water and then inverted into a bucket filled with water, and a hose placed in the inverted bottle and the gas permitted to escape into it.



Steel storage tank in Crane-Upton Field showing failure in side sheets near bottom due to corrosion. Wooden plugs are put in holes and held in place by braces. This tank was approximately nine months old.

Wooden plugs placed in holes in side sheets in storage tanks.

Common Mistakes

The bottle was emptied of its water, but as the hydrogen sulphide gas is soluble in water at the proportions of 4.37 volumes of H_2S to 1 of water at 32 degrees Fahrenheit and about 2.8 volumes at 60 degrees Fahrenheit the gas was dissolved in the water and the bottle contained only air when it was sealed.

Another sample was shipped in a short piece of pipe closed at the ends with two iron caps, and when it reached the laboratory the hydrogen sulphide gas that had been introduced into it had made complete combine with the metal of the pipe.

These are old stories and the industry has become too familiar with the handling of the oil and gas to repeat these mistakes, but there are still numerous conditions that enter largely into this problem that can only be solved by field work, and it is suggested that the committee of the American Petroleum Institute give consideration to inaugurating research of this character so that the industry may be benefited by having the problems reduced to terms common to it and the chemist and metallurgist may have set forth clearly the requirements of the oil field conditions which should assist them materially in solving the problems.

In the meantime those things that have been accomplished in the way of retarding the corrosive action in field equipment will be set forth, at least in part, and it is hoped that this discussion may serve two purposes, to assist in the work in the field, and point the way to the chemists and metallurgists to producing products better suited to the field conditions.

Field observations have shown several characteristics of this accelerated type of corrosion that are common to equipment handling sulphur oils and gases of West Texas and the Panhandle area.

It is a well-known fact that all iron and steel will corrode in time in any climate if moisture is present, but it has been noted in all industries that where sulphur is present in some form in the products handled, or even in the atmosphere surrounding equipment, the corrosive action on the ferric material is greatly increased.

Electrolytic Theory

The electrolytic theory of corrosion is now generally accepted and seems to explain known facts relating to corrosion better than any other which has been offered. This theory being accepted it follows that impurities in the iron and steel greatly increase the rate of penetration into the metal and one of the first essentials in combating corrosion in the field is to select material as nearly homogeneous as possible.

Areas of different "solution" pressures have been found in the same piece of iron and steel and this condition seems to be accelerated greatly, from 40 to 45 times, by the presence of iron sulphide, which is very common to all equipment used in these oil fields.

This iron sulphide scale is probably formed by the following chemical changes:

1. $Fe + H_2S + HOH = FeS + H_2$

Then in the presence of oxygen and moisture basic FeS is oxidized to basic sulphate and free sulphur, or the end products may be illustrated:

2. $2FeS + 1\frac{1}{2}\ O_2 = Fe_2O_3 + S$

This sale is cathodic with respect to the steel and where it comes in contact with iron or steel they are rapidly destroyed.

The iron sulphide scale is most evident on the underside of the tank deck or roof and forms there in considerable quantity, breaking away through movement of the tank, and this scale falls into the oil in the tank and through it to the bottom, or is carried by convection currents in the oil to the sides.

Protective Coatings

Recommendations have been made to use certain classes of protective coatings on the under side of the deck and on the inner sides above the oil level of the tank to prevent this combination of iron and sulphur and it has been found to assist, but it does not completely protect the other parts of the tank, for iron sulphide scale can be formed beneath the oil or water level, or can be introduced into the tanks from the pipe system between them and the well.

There is therefore a very considerable area within a lease storage tank still in need of reliable protective coatings and as this area is covered with oil and water and these liquids contain numerous other elements, some of which are quite active in their attack upon paints and lacquers, the problem of protecting sides and bottom of tanks is not one offering a simple solution.

It has been suggested that wetting the under side of deck and sides of a tank with a spray of oil will retard corrosion, but inasmuch as examination of tankage in numerous fields shows that corrosion has occurred in sheets that have been kept covered with oil practically all the time, it hardly seems logical to accept this method as practical.

Some have assumed that the natural coating of paraffin deposited on the sides of the tanks forms a protective coating. Examination of the steel under this paraffin has disclosed that it has been badly pitted.

It was found that the paraffin coat contained numerous moist spots and under certain light conditions these were very noticeable, and when broken with the sharp point of a knife blade discharged a little liquid, and probing around under this spot would disclose a pit well advanced in its formation.

It has been stated that the paraffin coating has protected the tubing in the well where it has been deposited. It is suggested that another cause for this lack of corrosion in the zone covered with paraffin might account for this condition, and that is temperature changes.

To deposit the paraffin out of the oil in the tubing there must have been a lowering of temperature and according to one of the laws of gases they are less active at lower temperatures so it would be less active in that zone where the paraffin has been dropped out of the oil.

Cool Gases Less Corrosive.

There is other evidence of this condition of cooling of the hydrogen sulphide gas retarding corrosion.

In the Westbrook, Texas, field tanks fitted with water sealed tops are used. These are flat topped tanks with a water ring about 12 inches high around the edge which is filled with about 9 inches of water and this fluid tends to keep an even temperature in the top of the tank and corrosion there has been less active since this form of deck has been used.

Double gas stack on lease storage tanks in Upton, Crane Field, West Texas.

Normally tank decks become hot during the day and are cooled at night. The heated period would tend to make the gas within the tank more active and at night water vapors would be condensed on the under side of the deck and with their entrained oxygen present a combination that might assist in the formation of iron sulphide scale.

By this statement it is not meant that

(Continued on Page 185)

Solids precipitated from leak in storage tank bottom in Upton County.

High Gravity Crude Prices Advanced

Kansas, Oklahoma and Texas Oils Above 36 Gravity Are Given Increase. Good Demand for High Gravity Crude

By James McIntyre

What is believed to be the first of a series of advances in the market prices of higher-grade crudes was posted by the Carter Oil Co. on February 21, effective in Kansas and Oklahoma. The schedule of the Carter Oil Co. was immediately adopted by all the purchasing companies in Kansas, Oklahoma, North and Central and East Central Texas on oils of 32 gravity and above, while, at the same time the Humble Oil & Refining posted a new schedule of prices in the Texas Panhandle fields. The Magnolia Petroleum Co. posted a different price schedule than the others on oils below 32 gravity, in the areas in which that company buys on a gravity basis.

The new price schedule for Oklahoma and Kansas increases the net value of the production of those States about $10,500 per day, based on the production of February 20.

The increased value of Kansas crude will be $236 per day. The increased value of North and Central Texas crudes will be somewhere in the neighborhood of $3,500 per day.

The value of the 20,000,000 bbls. of crude in storage in the Seminole Field is increased at least $200,000 and the 2,200,000 bbls. of crude in storage in the Burbank Field was also increased in value.

The new price schedule favorably affects all the North Central and East Central Texas fields. As all crudes above 36 gravity were increased more or less only a small proportion of the production of that area was unfavorably affected.

In Kansas 66,100 bbls. of daily production was increased in value $2,584 and 39,704 bbls. was given a lower value, amounting to $2,348.36 per day. Four thousand barrels of production was unaffected by reason of the fact that there was no change in the price of 36 gravity oil.

In Oklahoma out of a production of 665,393 bbls., 487,453 bbls. was benefited by the new schedule and its value increased $18,161.36 per day, while 158,940 bbls. was cut in price and its value lowered $7,691.13 per day. Approximately 19,000 bbls. of production scattered through the pools in the State was unaffected or very little affected, one way or the other.

Seminole Benefited

The 308,706 bbls. produced in the Seminole Field was increased in value $12,348.24 per day. Other fields that benefited by the change in price schedule included Blackwell, 3 cents per bbl; North Braman, 6 cents; South Braman, 7 cents; Garber, from 6 cents to 11 cents; the highest grade oil in Osage County (51 gravity), 15 cents; Burbank and Cushing crude, 1 cent, 2 cents and 3 cents; Thomas and Tonkawa, 6 cents and 7 cents. Higher grade oils produced in Bristow, Hubbard, Jennings, Knox, Deep Rock, Yale-Ingalls, Mervine, Papoose, Jarvis-Holm, Cromwell, Pearson, Wewoka, Otoe, Thomas and Duncan were benefited more or less.

Prices Lower in Old Pools

The fields that bear the brunt of the reduced prices are Bristow, Brock, Cement, Cleveland, Fox, Graham, Healdton, Hewitt, Madill, Nowata-Rogers, Bartlesville, old Osage fields, Sholem Alechem, Seay, Cushing, Duncan, Walters, Robberson, Glenn Pool, Okmulgee fields, Tulsa pools, and Loco-Milroy. In these pools the reductions were all the way from 1 cent to 36 cents, but fortunately there is little crude produced in the State below 28 gravity, which grade was cut 16 cents.

The Carter Oil Co. in posting its new schedule said it was attempting to interpret in terms of crude values the present market of refined products. The Humble Oil & Refining Co. in making its price for North Central Texas said it was attempting to interpret in terms of crude value the present market value of fuel oil and gasoline, which in slightly different language expressed the same meaning as the Carter Oil Co. The Humble company also said that in posting the new schedule for the Panhandle crudes it had increased the posted price because it is no longer adding to storage in the Panhandle nor shipping any more of that crude by tank car.

The Magnolia Petroleum Co. which posted new prices on lower grades on February 16 revised the schedule on February 21. While its North Central and East Central Texas, Oklahoma and Kansas prices for oil from 32 gravity upward are the same as that of the Carter, Humble and others, it quotes 30 gravity at below at 75 cents; 30 to 30.9 gravity at 90 cents; 31-31.9 at $1.05. The Magnolia prices are 6 cents under the others on 31 gravity; and 16 cents under on 30 gravity crude and from 1 cent to 35 cents under on crudes below 30 gravity. This affects the Southern Oklahoma fields most severely, although it is believed that the Magnolia does not buy more than 2,600 bbls. a day of oil in that territory.

The details of the various crude changes made on Tuesday will be found on page 181 of this edition.

Schedule Well Received

The revised schedule of prices was received with favor by most oil men in Tulsa, although disappointment was felt by the owners of old settled production who are not also producers of the higher gravity oils in the newer fields. On the other hand the bulk of the oil in the northern fields of the Mid-Continent were increased in value by the new prices. Over 700,000 bbls. of daily production benefited by the new schedule, while about 200,000 bbls. was in any way reduced in value. These figures do not include the Panhandle fields, where a net increase in prices resulted from the new schedules posted. There was no change in the postings on West Texas.

Kansas, Oklahoma and Texas Gravity Schedule Effective February 21

Gravity—	New Posted Price	Old Posted Price
24-24.9	$ .76	$1.12
25-25.9	.81	1.12
26-26.9	.86	1.12
27-27.9	.91	1.12
28-28.9	.96	1.12
29-29.9	1.01	1.14
30-30.9	1.06	1.16
31-31.9	1.11	1.18
32-32.9	1.16	1.20
33-33.9	1.19	1.22
34-34.9	1.22	1.24
35-35.9	1.25	1.26
36-36.9	1.28	1.28
37-37.9	1.31	1.30
38-38.9	1.34	1.32
39-39.9	1.37	1.34
40-40.9	1.40	1.36
41-41.9	1.43	1.38
42-42.9	1.46	1.40
43-43.9	1.49	1.42
44-44.9	1.52	1.44
45-45.9	1.55	1.46
46-46.9	1.58	1.48
47-47.9	1.61	1.50
48-48.9	1.64	1.52
49-49.9	1.67	1.54
50-50.9	1.70	1.56
51-51.9	1.73	1.58
52 and above	1.76	1.60

Hutchinson and Carson Counties, Texas

Price schedule posted by the Humble Oil & Refining Co., February 21:

Gravity—	New Price	Old Price
Below 31	$.60	$.75
31-31.9	.65	.75
32-32.9	.70	.75
33-33.9	.73	.75
34-34.9	.76	.75
35-35.9	.79	.75
36-36.9	.82	.75
37-37.9	.85	.75
38-38.9	.88	.75
39-39.9	.91	.75
40-40.9	.94	.75
41-41.9	.97	.75
42-42.9	1.00	.75
43-43.9	1.03	.75
44 and above	1.06	.75

Gray County, Texas

Price schedule posted February 21 by Humble Oil & Refining Co.:

Gravity—	New Price	Old Price
Below 27	$.60	$ ..
27-27.9	.65	..
28-28.9	.70	.80
29-29.9	.75	.82
30-30.9	.80	.84
31-31.9	.85	.86
32-32.9	.90	.88
33-33.9	.93	.90
34-34.9	.96	.92
35-35.9	.99	.94
36-36.9	1.02	.96
37-37.9	1.05	.98
38-38.9	1.08	1.00
39-39.9	1.11	1.02
40-40.9	1.14	1.04
41-41.9	1.17	1.06
42-42.9	1.20	1.08
43-43.9	1.23	1.10
44 and above	1.26	1.12

Wheeler County, Texas

Price schedule posted by the Humble Oil & Refining Co. on February 21:

Gravity—	New Price	Old Price
Below 29	$.60	$.75
29-29.9	.65	.75
30-30.9	.70	.75
31-31.9	.75	.75
32-32.9	.80	.75
33-33.9	.83	.75
34-34.9	.86	.75
35-35.9	.89	.75
36-36.9	.92	.75
37-37.9	.95	.75
38-38.9	.98	.75
39-39.9	1.01	.75
40-40.9	1.04	.75
41-41.9	1.07	.75
42-42.9	1.10	.75
43-43.9	1.13	.75
44 and above	1.16	.75

MOVEMENT INAUGURATED TO CURTAIL PRODUCTION OF LOW GRAVITY CRUDES

Movements of great importance to the entire petroleum industry are under way with a view of balancing the output of low gravity crude oils with market requirements. With low prices obtaining for fuel oil and the supply of this product and the grades of crude from which it is made considerably above demands, efforts are being made to hold the production of low grade oils to a minimum.

Chief efforts at this time are centering in California and, it is understood, in Venezuela. California operators are facing a serious situation owing to the piling up of stocks and production of low gravity crudes and fuel oil and the lack of markets for these products. Venezuela crude is being shipped to Atlantic Coast refineries in large quantities and is being delivered there for from 70 to 75 cents a barrel. Advices from the East indicate there is a possibility of agreements being reached whereby production of Venezuela crude, which is desirable chiefly for its fuel oil content, will be curtailed until there is a greater demand for this type of oil.

California Situation

Although California operators drew on stocks for more than 8,000,000 bbls. last year, the industry is face to face with a very serious situation due to excessive production of heavy crude and the inability of eastern domestic marketers to absorb the anticipated heavy output of fuel oil and residuum during the current year. Not a barrel of fuel oil has left California for either the Atlantic Seaboard or Gulf Coast since January 1, and while it is impossible to ascertain just how much will move east this year it is a foregone conclusion that the amount listed during 1928 will be considerably less than last year.

The seriousness of the situation just mentioned is not apparent on the surface but it is appreciated by all the major companies and many California executives are deeply concerned over this unexpected development. Stocks of light refining crude in California declined 10,000,000 bbls. during the past year but heavy crude and fuel oil on the other hand have been consistently accumulating over a period of several years and at last report there were 93,000,000 bbls. of this commodity in storage. In order to correct this situation, California operators will shut in every barrel of heavy crude oil production possible and while no actual curtailment has yet been effected restrictive measures are expected to be undertaken within the next 10 days.

There is approximately 80,000 bbls. per day of heavy crude shut in at present and the concerted move now under way will probably add another 50,000 bbls. of daily production to this figure within the next 30 days.

May Cut to 550,000 Bbls.

Engineering representatives of the principal operators at Ventura Avenue have held several informal meetings and a reduction in production of 20 per cent has been tentatively agreed upon. This field is producing approximately 52,000 bbls. of light crude oil per day at present and the inauguration of the proposed restriction will assist in the program to conserve the national gas supply sponsored by Governor Young.

The curtailment to be made in heavy crude production will be statewide and while efforts to bring the west front area into line have succeeded as far as producing companies are concerned the lessors have not yet agreed and some difficulty may be experienced. It is absolutely impossible to curtail production at Long Beach due to competitive drilling and this field is expected to show an increase of 50,000 bbls. per day within the next three months. This light oil can be used by refiners to advantage and while the residuum naturally backs up into heavy oil stock this factor can be taken care of if the possible additional production of residuum is offset by comparable curtailment in heavy oil. The success of the curtailment program to be initiated depends to a large extent upon the co-operation given producers by landowners.

If entirely sucessful, the anticipated restriction in production will result in widespread benefit to the industry in general and may bring present production down to around 550,000 bbls. daily.

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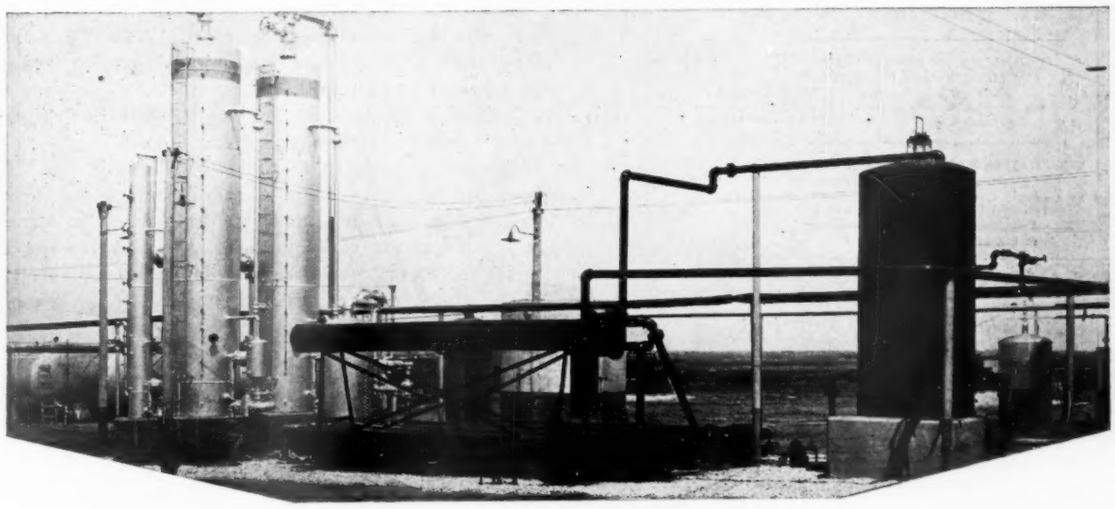

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TURNING THE CORNER

The advance in light gravity crude prices confirms the impression which had been steadily gaining ground that the industry has definitely turned the corner.

The crude production trend and the gasoline days' supply figures have been significant to students of the improving situation, unfailing signs of recovery from the prolonged depression that began more than a year ago.

The daily average production of crude on February 4 was 180,000 barrels less than on August 6, but that is only part of the story.

The production of light or sweet crudes, most desirable for refining, was 252,000 barrels a day less than six months ago. The heavy or sour oil production was 71,700 barrels more.

That was the real background for the advance in crude prices, that and the fact that gasoline days' supply January 1 was less than on that date for four years, and 25 per cent less than a year before.

Behind this is the fact that distributors' stocks are exceptionally low, jobbers generally having failed to increase their supply as usual in December and January when it has been the custom to take advantage of prices to prepare for the season of maximum consumption.

This winter they appear to have followed the example of industry and business in general in adopting hand-to-mouth buying believing they would be able to get what they needed as required.

Altogether it was a wholesome situation, offering more opportunity for stabilization than the industry has had in many a day. Here is the chance to make a fresh and favorable start right on the eve of the opening of the major gasoline consuming season.

The advance in crude, recognizing the conditions in the producing field, supplies a strengthening tone to the market for petroleum products. It will convince distributors that there is nothing to be gained by further delay in providing for their requirements during the summer months, and in fact that delay may be more costly.

With the prospect of the output of light or sweet crudes declining until well into the summer the possibility of higher crude prices must be considered by both refiners and distributors.

The fact that the production of heavy or sour crudes is increasing, although the total output of all oils is declining, points the same way.

Gasoline may, of course, be produced from these crudes but in view of the difficulties encountered in refining it must be at a higher manufacturing cost which in turn must be reflected in the price of the products produced.

Proportionately lower prices for the heavier and sour crudes will not alter this because as fuel oil becomes cheaper competing with coal in price as well as in advantages, more and more of it will be used for that purpose.

Another fact to be remembered in connection with the West Texas crudes is that because of freight conditions only coastal refiners can use them to advantage. The great interior markets for gasoline must get their supply from the light or sweet oils which are declining in production and likely to continue so until the middle of summer.

In considering the crude situation it should not be forgotten that there were 4,500 less wells completed last year than the year before. This means that there are 4,500 fewer wells contributing settled production than might have been the case had it not been for the overproduction of 1927 and the consequent decline in operations in the producing fields.

Eastern refiners are beginning to draw upon Mid-Continent high-grade oils and are taking less of the West Texas and Gulf Coast heavy crudes. They are also renewing contracts for California oils, gasoline and fuel oil.

California, however, is holding its fuel oil firmly, because of its special position in that regard.

The possibilities in respect to Venezuelan and Colombian oils which can be delivered in Eastern ports more cheaply than Gulf Coast crudes have often been mentioned but it is important to recognize that production in these fields is in strong hands and not subject to the uncertainties of competitive overproduction.

The whole thing comes down to just this: The oil industry the world over has suffered for a year from the consequences of overproduction. Essential values have been sacrificed, profits lost and time and energy wasted.

The situation is shaping around so we can get a fresh grip. The indications are favorable and we can keep them so if we determine to do it. If we can consolidate our position we can stabilize the industry on a sound basis, provided we make reasonable profit the goal instead of mere volume of business.

Happily there are multiplying signs that the industry has learned that lesson, costly though it may have been.

The adoption by the directors of the American Petroleum Institute at Chicago of the report of the Beaty Committee on Agreements for curtailment in time of overproduction reflected the new spirit in the industry.

Discussion of the unit operation plan as a further step in conservation is being crystallized into practical form. The suggestion offered by Judge Amos L. Beaty in this issue of The Oil and Gas Journal, coming from a recognized authority on the legal and practical phases of the problem, presents a tangible basis for action.

There will probably be an increase in light or sweet oil production during the summer but coming at the period of heavy gasoline consumption it need not be alarming.

The big hope is that, with the present improvement, the industry will not permit itself to get into another such predicament as that of last year. It knows now that control is possible. It realizes also the effect of these wild fluctuations and that substantial and enduring prosperity can be secured only by stabilization.

It has too often been grasping at shadows and letting the substance drop.

There has been too much of "the lure of the liquid gold" and too little attention to the daily dollars.

The industry as a whole lost money it might have earned last year. This year it has the prospect of earning some. Causes and conditions point to better prices.

Those who have been marking time until the depression was over can step out with the confidence that 1928 will be what they make it. The industry emerges from a year of trials with new strength, with clearer foresight and a deeper and wider knowledge of what it can and what it ought to do.

DRESSER COUPLINGS

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Open New Pools in North Texas Area

Another Pay in Fluhmann Pool. "Sweet" Grass Roots Producing Area Opened in Young County. Brisk in Ranger

By James H. Dameron
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Feb. 20.—Ranger district and Wichita Falls district were the outstanding areas in North Texas during the week while the Panhandle was without developments of a colorful nature. In the two former districts the opening of new pools or extensions served to keep them bristling with excitement.

The purchase of the Wichita Pipe Line Co. by the Pure Pipe Line Co. for a reported price of $950,000 marks the entry of the Pure company in that section of Texas. Wichita Pipe Line Co. has 328 miles of 2, 3, 4 and 6-inch lines running oil from Archer, Jack, Wichita and Young Counties. In addition the line has 10 pumping stations and 250 miles of communication lines.

Pure Pipe Line Co. will take over operation of the line March 1. It is reported that the Wichita Pipe Line Co. will probably be dissolved when the property transfer goes into effect. So far as can be learned no announcements have been made concerning the present disposition of crude. The Wichita company supplies crude to refineries in the Wichita Falls district.

Activity around the Geraldine Townsite in Archer County was stimulated when a one-half-mile extension was made to the Golhke Pool. D. C. Johnson's No. 1 L. F. Wilson, 150 feet from the north and east lines of Block 26, Geraldine Townsite, had the pay at 1,558-64 feet and is estimated to be good for anywhere from 75 to 100 bbls. daily. The discovery well, one-half mile south, is making around 50 bbls. daily. With the extension, trading in that immediate area moved along more briskly and drilling is going forward at a rapid pace.

New Pay in Fluhmann Pool

A new pay horizon was added to the Fluhmann Pool in Wilbarger County when Roxana Petroleum Corp.'s No. 1 J. T. Milner, Section 30, Block 9, swabbed 100 bbls. the first 14 hours from sand topped at 1,680 feet. The pay was penetrated 5 feet.

The well was an old producer from the 1,450-foot sand and was drilled deeper in an effort to get production from the 1,800-foot sand. The well is the farthest east producer in the field. It is estimated it will make a good 50-bbl. pumper. The discovery of the new pay zone makes the third pay zone in that pool, namely, the 1,460-foot zone, 1,680-foot zone, and the 1,800-foot pay.

Three miles northwest of Loving, in Young County, Pennell Oil Co. and Cunningham's No. 1 J. L. Boone, NW cor. of B.B.&C.R.R. Survey, Abstract No. 34, opened a "sweet" grass roots producing area. No. 1 Boone had the pay at 504-15 feet and pumped 100 bbls. of 40 gravity crude the first eight hours. The well has been shut down awaiting the erection of storage. The well is more than a mile south of an old shallow producing area and it is believed the new strike will create a fair sized drilling campaign for the grass roots production. Three offsets will be drilled immediately.

Production in the Wichita Falls district showed a decline of 919 bbls. during the past week due to the normal decline of old wells and the lack of flush production to offset it. Archer County went below 20,000 bbls. in daily average for the first time in years. In December, 1923, Archer County's production was 19,037 bbls. daily.

In the Ranger district developments were even more brisk than in the Wichita district, with Brown and Coleman Counties showing flashes of the life that Brown County boasted of for months.

New Pool in Brown County

Clark-Buffalo Oil Co.'s No. 1 Brown County fee land, NW of Section 624, James Kenney Survey, opened a new pool in the midst of a flock of dusters. The well is on an 11-acre tract owned by Brown County and is 1 mile north of Thristy. The well had dry sand at 1,090-96 feet and oil sand at 1,096-1,102 feet. It made 240 bbls. initially.

Fourteen hundred feet to the north is a dry hole and the producer is in the midst of several dry holes that are in a radius of about a half mile. Production is believed to be coming from the Fry sand. The well is approximately 2 miles east of the Fry Pool and a little more than a half mile south of the Pandem-Hutton Pool. Five offsets have been started up and three new locations made.

In the Pandem-Hutton Pool to the north, four wells were completed, the largest of which was a 75-bbl. well drilled on the Pandem Oil Co.'s Hutton lease.

Considerable activity has followed the completion of Gillman & McMurray's No. 2 Roy Hickman, in the Thomas Benson Survey, No. 783, 6 miles northeast of Crosscut. The well was completed making close to 500 bbls. after a shot. Five new wells are drilling for the same pay. It is believed the discovery indicates a new pool. The nearest production is the old Blake Pool, half a mile south, but the two areas are separated by dry holes. Production of No. 2 Hickman is thought to be coming from the Crosscut sand.

South of Coleman

Two miles south of Coleman in Coleman County, Anzac Oil Co. and Continental Oil Co.'s No. 1 W. R. Gardner, NE cor. B. Ferguson Survey, No. 248, is good for 100 bbls. of 41.3 gravity oil naturally from sand at 2,298-2,305 feet. The well is at present shut down for storage. It flows by heads every two or three hours. Production is believed to be coming from a stray sand in the Strawn series. Prairie Pipe Line Co. will connect to the well.

Four miles southeast of Coleman, Roth and Faurot's No. 1 Stevens was completed making 190 bbls. daily on the pump from sand at 1,054-69½ feet. The same operators are preparing to shoot their No. 2 Sealy-Smith north of Valera and are causing interest to shift to that section. No. 2 is good for 50 bbls. daily at 2,910-35 feet, and No. 1 is to be drilled deeper from 2,582 feet upon the completion of No. 2.

The Morris Pool discovered several weeks ago has been definitely defined to the south by two dry holes but Eastland Oil Co. and associates completed another good well in the pool proper when their No. 1-B Morris made 296 bbls. initially. The north extension of the pool, Gwinn-up and Bradstreet's No. 1 Morris, was completed flowing 42 bbls. daily through the tubing after a 5-quart shot in the sand at 1,988-94 feet.

Production of the Ranger district showed a sharp increase in comparison with the previous week's estimate. Ranger showed the most noticeable increase by adding 2,500 bbls. to its daily average. This boost was the result of two good completions in the Ranger sand of wells in the Ramsover Pool, both making better than 1,000 bbls. initially. Shackelford reported an upward trend as a result of increased activities in the Cook Ranch Pool. Brown County's increase was due primarily to the pump in production of the Pandem-Hutton Pool.

Snowstorm in Panhandle

A snowstorm over the Panhandle held that area in abeyance and what it did not do for the industry it did for agriculture by aiding the wheat crop.

The Bowers Pool finished a quiet week with two small completions. Gulf Production Co.'s No. 2 Bowers, in Section 89, in the northwest part of the pool, made only 35 bbls. from a total depth of 3,134 feet and Delaney and others' No. 2 W. Jackson made only 45 bbls. daily after being plugged back from 3,054 feet where salt water was encountered. Phillips Petroleum Co. deepened a well in the Wilcox-Pampa Pool and doubled its production to 400 bbls. Two other completions were reported, a small oil well making water and a gas well swabbing about 12 bbls. of oil daily.

The Texas Company's No. 1 Thut, Section 1, Block 1, Gray County, and in semiwildcat territory, is drilling at an interesting depth. Saturday the well encountered 3,000,000 feet of gas at 2,436-40 feet and is drilling ahead. The well is in the LeFors area where The Texas Company brought in a good producer a few weeks ago.

Panhandle stocks were reported to be on the increase during the past week. Stock reports as of February 1, showed 18,318,000 bbls. of crude in storage as follows:

	Bbls.
Carson County	5,042,000
Gray County	5,557,000
Hutchinson County	7,662,000
Moore County	10,000
Wheeler County	47,000
Total	18,318,000

PANHANDLE DISTRICT
Week Ending February 18, 1928
Gray County

Delaney and others' No. 2 W. Jackson, E half SW, Section 88, Block B-2, was drilled into salt water at a total depth of 3,054 feet. The well was plugged back to 3,025 feet and flowed 45 bbls. daily from the granite wash found at 2,977-3,025 feet. Gurnsey Oil Co.'s No. 2 B. E. McKinney, Section 163, Block 3, I.&G.N. Survey, was drilled to a total depth of 3,350 feet and was plugged back to 3,290 feet. After a shot of 280 quarts the well made 15,000,000 feet of gas from pay at 3,160 to 3,278 feet and swabbed 12 bbls. of oil daily from pay at 3,026 to 3,110 feet. Phillips Petroleum Co.'s No. 3 H. M. Davis was formerly completed at a depth of 3,129 feet, where the well made 200 bbls. The well has not been drilled on down to 3,216 feet and is now producing 400 bbls. from the granite wash found at 3,212-16 feet. Gulf Production Co.'s No. 2 Bowers, W half, Section 89, Block B-2, H.&G.N. Survey, was completed at the depth of 3,134 feet with an initial production of 35 bbls.

Hutchinson County

Prairie Oil & Gas Co.'s No. 53 Johnson

WILDCAT OPERATIONS IN PANHANDLE

Week Ending February 18, 1928

Company, Well, Farm, Name, Section and Block—	Remarks—
ARMSTRONG COUNTY	
United Oil & Trust Co.'s No. 1 J. P. Reck, Sec. 162, Blk. 4, H. & G. N. Sur.	Drlg. lime, 3,596 ft.
BAILEY COUNTY	
Gibson Oil Co. et al's No. 1 Webb Miller, NE cor. Sec. 15, League 186, Swisher County school land	Rig.
Humble O. & R. Co.'s No. 1 W. H. Fuqua, C E ½ Sec. 117, Blk. A. Melvin, Blum & Blum Sur.	1,600 ft. wtr., 4,015-35 ft; S.D. for orders, 4,085 ft.
BRISCOE COUNTY	
C. S. Rice's No. 1 J. C. Anderson, SE cor. NW NW, Sec. 32, Blk. B-3, B. S. & F. Sur.	S.D., 1,620 ft.
CARSON COUNTY	
Amarillo Oil Co.'s No. 1 E. S. Polling, C NE of N 80 acres of NE, Sec. 12, Blk. Y-2, B. & B.	Bldg. rig.
Amatex Dev. Co.'s No. 1 E. S. Polling, Sec. 22, Blk. 2-Y,	T.A., 2,110 ft.
Empire G. & F. Co.'s No. 1-A Texas Co. fee, C NE, Sec. 60, Blk. 4, I. & G. N. Sur.	Drlg., 400 ft.
Empire G. & F. Co.'s No. 1 White Deer Inv. Co., C SE of Sec. 51, Blk. 4, I & G. N.	Drlg., 320 ft.
Marston Oil Co.'s No. 1 J. L. Noel	Drlg., 2,820 ft.
Skelly Oil Co.'s No. 8 H. Schafer, NE SW SW, Sec. 54, Blk. 4, I. & G. N. Sur.	Location.
The Texas Company's No. 2 C. R. Garner	15,000,000 ft. gas, 2,300-25 ft; S.D., 2,425 ft.
The Texas Co.'s No. 1 W. H. Cobb, NE SE SE, Sec. 202, Blk. 3, I. & G. N. Sur. (Lease S 100 A SE)	Drlg., 481 ft.
CASTRO COUNTY	
Colorado O. & R. Co.'s No. 1 M. Siemmons, SW cor. Sec. 72, Blk. M-17, B. S. & F. Sur.	Rig blown down.
Mystery Oil Co.'s No. 1 J. I. Crum, SE cor. NE Sec. 233, Blk. M-6, S. K. & K. Sur.	S.D., 510 ft. for csg.
CHILDRESS COUNTY	
Hoover & Calloway's No. 1 O. L. Tucker, Sec. 736, Haggard Sur.	Spudded and S.D.
C. L. Sloane et al's No. 1 B. P. Smith, Sur. 49, F. P. Knott lands	Set 6-in., 2,902 ft; S.D., 3,745 ft.
COTTLE COUNTY	
Exploration Co.'s No. 1 Richards	Spudded and S.D.
DALLAM COUNTY	
Wood Bros. et al's No. 1 Capitol Synd., Sec. 19, Blk. 17.	Hole full wtr., 4,007-4,127 ft; drlg. 4,330 ft.
Marland Oil Co.'s No. 1 A. M. James, C SW W ½ Sec. 21, S. H. McElreath Sur.	T.D., 3,575 ft; U.R. 6-in. csg., 3,562 ft.
Marland Oil Co. et al's No. 1 Capitol Synd., Sec. 36, Blk. 18, Capitol Synd. land	S.D., 3,500 ft.
DONLEY COUNTY	
A. T. Drlg. Co.'s No. 1 F. E. Harrington, Sec. 39, Blk. 3-C	1,200 ft. wtr., 2,115-22 ft; show gas, 3,140-60 ft; dry G.W., 3,200-93 ft; T.D., 3,498 ft; U.R. 5-in., 3,470 ft.
FLOYD COUNTY	
Expltn. Co.'s No. 1 S. H. Boone, C. C. H. Johnson Sur.	Spudded and S.D.
Expltn. Co.'s No. 1 Land & Cattle Co.	S.D., 730 ft for orders.
Hoffer Oil Corp.'s No. 1 Nelson	Spudded and S.D.
GRAY COUNTY	
Archer Blake's No. 1 Turneaux, SW cor. Sec. 111, Blk. B-2	S.D., 255 ft.
Bay Shore Oil Co.'s No. 1 C. W. Bradford, Sec. 143, Blk. 2-B	T.D., 2,666 ft; S.L.M. shot with 10 qts. to loosen bit and 8-in. collapsed; S.D., 2,795 ft.
Biggs et al's No. 1 Morse, SW cor. Sec. 3, Blk. 26, H. & G. N. Sur.	Rig.
Cole O. & G. Co.'s (was Magdalene Oil Co.'s) No. 1 J. E. Williams, Sec. 17, Blk. 1	S.D., 3,360 ft.
Danciger O. & R. Co.'s No. 7 W. Jackson, Sec. 88, Blk. B-2, H. & G. N. Sur.	3,000 ft T.D.; making 5,000,000 ft. gas from 2,779-3,000 ft. and 5 bbls. oil; stdzng., 3,000 ft.
Danciger O. & R. Co.'s No. 9 W. Jackson, NW cor. NE NW, Sec. 88, Blk. B-2	Drlg., 1,920 ft.
Danciger O. & R. Co.'s No. 10 W. Jackson, NE cor. NW NW, Sec. 88, Blk. B-2	Drlg., 1,600 ft.
Danciger O. & R. Co.'s No. 1 W. Crank, SW cor. NW, Sec. 162, Blk. 3, I. & G. N. Sur.	Boiler on location.

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Bros.-A ,toppd the lime pay at 2,995 feet and was drilled to a total depth of 2,997 feet. The well swabbed 40 bbls. of oil and 100 bbls. of water the first 24 hours.

ESTIMATED DAILY AVERAGE PRODUCTION NORTH CENTRAL TEXAS Week Ending February 18, 1928

Panhandle—	
Carson County	7,425
Gray County	20,835
Hutchinson County	48,615
Moore County	0
Potter County	30
Wheeler County	950
Total this week	77,855
Total last week	79,915
Decrease	2,060
Wichita Falls District—	
Archer County	19,755
Baylor County	90
Clay County	515
Cooke County	3,656
Jack County	1,367
Montague County	9,368
Throckmorton County	1,044
Wichita County	26,209
Wilbarger County	10,212
Young County	8,813
Total this week	81,029
Total last week	81,948
Decrease	919
Ranger District—	
Brown County	13,100
Callahan County	3,897
Coleman County	1,725
Comanche County	1,318
Palo Pinto County	450
Ranger	10,191
Shackelford County	6,975
Stephens County	8,601
Total this week	46,257
Total last week	43,715
Increase	2,542
Grand total this week	205,141
Grand total last week	205,578
Decrease	347

WICHITA FALLS DISTRICT

Archer County

F. H. Gohlke's No. 1 Parrish, had an initial production of 42 bbls. in pay found at 1,552-54 feet. F. C. Greben and others' No. 1 Waggoner was dry and abandoned at 1,910 feet. Holcombe & Jones' No. 2 Kemp-Kell found the pay at 764-74 feet and had an initial production of 12 bbls. H. M. Kelicher and others' No. 1 Andrews was dry and abandoned at 1,528 feet. United Producers Co.'s No. 3 Perkins and others topped the pay at 1,029-35 feet and had an initial production of 12 bbls. Bridwell Oil Co.'s No. 1 Burns topped the pay at 1,504-13 feet and had an initial production of 22 bbls. of oil and 5 bbls. of water.

Cooke County

Hoffer Oil Corp.'s No. 1 Wilson has been temporarily abandoned at 2,100 feet. Vacuum Oil Co.'s No. 1 Beckleman Heirs was dry and abandoned at 3,960 feet.

Haskell County

Kouri's No. 1 Reynolds was dry and abandoned at 2,005 feet.

Jack County

Amerada Petroleum Co.'s No. 1 G. L. Fry was dry and abandoned at 735 feet. Same company had four other wells dry and abandoned in this county during the past week as follows: No. 2 G. L. Fry at 800 feet; No. 1 J. E. Shaw at 620 feet, and No. 2 J. E. Shaw at 470 feet.

W. H. Kerbow and others' No. 1 Gowdy was also a duster at 650 feet and has been abandoned. Measure & Foudren's No. 1 Massie was dry at 507 feet and has been abandoned. Seaboard Oil & Gas Co.'s and others' No. 3 Cullers found the pay at 2,012-25, with an initial production of 45 bbls. Shaw & Rathke's No. 7 Cullers had an initial production of 50 bbls. from pay found at 2,005-12½ feet.

Montague County

Beriton-Woods and others' No. 1 McCall was dry and abandoned at 2,327 feet. Sigler & McGinley's No. 1 Loy and others was dry and abandoned at 1,210 feet. Carter & Ryeade Corp.'s No. 5 Cunningham and others found the pay at 901-29 feet and had an initial production of 50 bbls.

Wichita County

Chester Everts' No. 1 Cooper was junked at 1,688 feet. L. P. Hammond's No. 3 Ferguson was dry and abandoned at 490 feet. Henry Hobbs' No. 1 G. R. Hodge was dry and abandoned at 1,855 feet. Jennings & Conyer's No. 1 Mrs. G. Jennings found the pay at 1,500-11½ feet and made 16 bbls. on the pump. J. C. Jennings and others' No. 1 T. L. Burnett had an initial production of 50 bbls. from pay found at 1,517-24 feet. Perkins-Cullum's No. 1-A Beaver-Elec. found the pay at 1,605-16 feet and is making 22½ bbls. on the pump.

Wilbarger County

Consolidated Oil Co.'s No. 1 Waggoner, Section 37, was dry and abandoned at 2,404 feet. Golding Cochran and others' No. 1 Waggoner-B was dry and abandoned at 2,782 feet. Milham Corp.'s No. 3 Waggoner-C was dry and abandoned at 2,223 feet. Phillips Petroleum Co.'s No. 12 Waggoner-NN found the pay at 2,583-85 feet and had an initial production of 10 bbls. Waggoner Refining Co.'s No. 2 Waggoner-E had 20 bbls. initial from pay found at 2,305-11 feet.

Young County

Allday Oil Corp.'s No. 1 Johnson found the pay at 571-85 feet and had an initial production of 35 bbls. Benson Oil Co.'s No. 1 Benson was dry and abandoned at 1,006 feet. Gulf Production Co.'s No. 5 T. L. Lisle was drilled to a total depth of 4,375 feet and plugged back to the lime at 4,000 feet. The well is making 35 bbls. oil and 200,000 feet of gas. Nash & Windfohr's No. 3 Hinson found the pay at 2,209-19 feet and is making 7 bbls. oil and 250 bbls. salt water. Parker and others' No. 1 Newman, was dry and abandoned at 650 feet. Wolf and others' No. 1 Howe found the pay at 840-43 feet and when put on the pump made 8 bbls.

RANGER DISTRICT

Brown County

Central Texas Refining Co.'s No. 2 Allcorn found the pay at 1,132-47 feet and had an initial production of 85 bbls. Clark Buffalo Oil Co.'s No. 1 Brown County fee found a dry sand at 1,090-96 feet and the well was drilled on down to oil sand found at 1,096-1,102 feet and had an initial production of 240 bbls. Gilman & McMurray's No. 1 Baugh was dry and abandoned at 1,975 feet. Miller's No. 1 Allcorn had an initial production of 15 bbls. after a 15-quart shot at 1,137-42 feet. Pandem Oil Co.'s No. 3 B. Curry topped the pay at 1,097-1,110 feet with an initial production of 75 bbls. in pay found at 1,115-27 feet.

M. L. Richards' No. 2 Curry found the pay at 1,097-1,107 feet and had an initial production of 30 bbls. Shuler & Davis' No. 1 Boysen was dry and abandoned at 1,275 feet. Syndicate Oil Co.'s No. 2 Curry had an initial production of 30 bbls. in pay found at 1,108-1,119 feet. Taylor and others' No. 1 Lewis was dry and abandoned at 1,173 feet. Texas Fidelity Oil Co.'s No. 1 Kennedy was dry and abandoned at 3,055 feet. Natural Gas & Fuel Co.'s No. 2 Capps made 300,000 feet of gas from pay found at 1,569-84 feet. Richardson & Hurst's No. 1 Mears had been temporarily abandoned at 1,380 feet. Ryan and others' No. 1 Fuller was dry and abandoned at 1,110 feet.

Coleman County

Eastland Oil Co. and others' No. 1-B Morris had an initial production of 296 bbls. from pay topped at 1,997-2,004 feet. Gwinnup & Bradstreet's No. 1 Morris flowed 42 bbls. through the tubing after a 5-quart shot at 1,988-94 feet. Roth & Faurot's No. 1 Stevens topped the pay at 1,054-69½ feet and when put on the pump made 190 bbls. Roxana Petroleum Corp.'s No. 1 Gray was dry and abandoned at 500 feet.

Comanche County

Trojan Oil Co.'s No. 1 Barnes has been temporarily abandoned at 3,610 feet.

Eastland County

Charter Oil Co.'s No. 1 Roper made 1,000,000 feet of gas at 1,361-81 feet. Belva Oil Co.'s No. 3 Good found the pay at 3,714-24 feet with an initial production of 1,200 bbls. of oil and 400 bbls. of water. Moody Corp.'s No. 2 Dyer was drilled to a total depth of 3,889 feet and plugged back to pay found at 3,620-30 feet and the well is making 6,000,000 feet of gas. Root and others' No. 2 Thorp had an initial production of 1,000 bbls. from pay found at 3,610-19 feet. West Adams Petroleum Corp.'s No. 3 Ramsower has been temporarily abandoned at 3,789 feet.

Palo Pinto County

Orbit Drilling Co.'s No. 1 Morgan has been temporarily abandoned at 1,200 feet.

Shackelford County

Hope Petroleum Co.'s No. 1-26 Reynolds was plugged back from 1,310 feet to sand found at 1,147-54 feet and is making 4,000,000 feet of gas. The Texas Company and Consolidated Oil Co.'s No. 5 Isbell found the pay at 715-25 feet and made 5 bbls.

Stephens County

Lyda and others' No. 1 Andrews was dry and abandoned at 502 feet.

Late News from the Field

OKLAHOMA

The Greater Seminole Field touched another new low on the 24-hour gauge ending Tuesday morning at 7 a.m. The production by pools was:

Little River	33,185
Bowlegs	90,115
Earlsboro	109,692
Seminole	56,706
Searight	18,325
Total bbls. from 1,082 wells	308,023

The Indian Territory Illuminating Oil Co.'s No. 1 Sullivan, the whimsical well in Section 25-7-3, the Pearson Switch area of Pottawatomie County is again recovering its production by flow after being deepened two feet. The well is now reported flowing 57 barrels an hour. The Magnolia Petroleum Co.'s No. 1 Harper, the west offset to the Sullivan well is now making 1,052 bbbls. daily.

The Allen Pool of Pontotoc-Seminole County is making 11,156 bbls. per day from 51 wells. The Mid-Continent Petroleum Corp.'s No. 1 Harjo, SW cor. NW NW, Section 14-5-7, has cored a sand 2,610-14 feet which apparently has good saturation, and a producing well is expected.

In the Bristow region of Creek County, Morgan & Flynn and Madden & Madden's No. 1 Sellers, NE cor. SE SW, Section 13-15-9, is making 160 bbls. from the Misener sand 3,290-92 feet. This well is 2 miles from production.

In the Bowlegs District of Seminole, Sinclair Oil & Gas Co.'s No. 2 Cosar, SE cor. NW NW, Section 10-8-6, is making 980 bbls. on air from sand 4,298-4,307 feet. Magnolia Petroleum Co.'s No. 3 Hammond, SW cor. NW NE, Section 10-8-6, swabbed 170 bbls. in 10 hours from sand 4,435-4,437 feet.

In the Earlsboro Pool, the Carter Oil Co.'s No. 2 Davis, NE cor. SW NW, Section 13-9-5, is flowing 685 bbls. and cutting 3 per cent. This is the south offset to the Prairie Oil & Gas Co.'s No. 5 Davis, the big well which was drilled in two weeks ago.

In the Burbank District of Osage County, the Phillips Petroleum Co.'s No. 1, SW cor. NW, Section 2-26-6, is flowing 260 bbls. naturally from the Burbank sand 2,770-2,852 feet. This well will be shot.

GULF COAST

HOUSTON, Tex., Feb. 21.—The East Hackberry Field of Cameron Parish, Louisiana, added its third good well when Calcasieu Oil Co. completed its No. 1 Watkins, flowing 2,500 bbls. of pipe-line oil daily from a total depth of 3,946 feet. This is the largest of the three wells in the field and extends production 200 feet north of the discovery well.

WEST TEXAS

FORT WORTH, Tex., Feb. 21.—Vacuum Oil Co. and Ladd and associates' No. 2 McMillan in the Elm Creek Pool of Runnels County is pumping 150 bbls. of oil and 10 bbls. of water from sand at 2,514-16 feet. The well is to be completed at that depth. Location has been made for No. 1 Fowler, 1,200 feet to the southwest. Shelden and Burdens' No. 1

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FIELD MEN IN WINKLER COUNTY CONSIDER WATER AND CASING

By James H. Dameron
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Feb. 18.—At the meeting of the committee of field men in the Hendricks Pool, Winkler County, Texas, this week, the casing committee, a subcommittee of the field committee, passed favorably upon a casing regulation.

Another subcommittee, appointed to investigate and report upon the water situation, particularly as it regards bottom hole water, did not make recommendations at the last meeting but is expected to make recommendations at the field committee meeting February 21.

The recent field committee meeting is the second of its kind since the appointment of the committee in Fort Worth a few weeks ago. Hendricks Pool operators met in Fort Worth at the request of R. D. Parker, chief supervisor, Oil and Gas Division of the Texas Railroad Commission, to consider the water situation in the Winkler County Pool. At that meeting it was decided to appoint a committee of field men because it was felt they were in more intimate touch with the developments as they transpired and would be in a better position to make recommendations. J. A. Morehouse, deputy supervisor, Oil and Gas Division, Texas Railroad Commission, is chairman of the field committee.

The first meeting of the field committee was held February 7 at Wink and, following a two-hour discussion covering practically all conditions in the field relative to setting and cementing of casing, it was decided to appoint the subcommittees. The subcommittee to make recommendations for casing regulations is as follows: N. D. Winters, Atlantic Oil Producing Co.; Alex Fields, Roxana Petroleum Corp.; W. F. Lewis, Republic Production Co., and A. E. Powell, Southern Crude Oil Purchasing Co.

The other subcommittee which was appointed to investigate and report on the water situation is comprised of H. H. Brewster, Pure Oil Co.; F. S. Seeley, Humble Oil & Refining Co.; A. B. Irion, Southern Crude Oil Purchasing Co., and Forney, Gulf Production Co.

After a lengthy discussion the water committee felt that it did not have sufficient information on the water encroachment to make recommendations at that time. However, this committee will continue its investigations and each member of the field committee will aid in the inquiry and will report upon the findings when the committee convenes at the next meeting. It is probable that definite conclusions will be reached at that meeting and recommendations made for corrective measures.

It is reported that every field condition, both individual and general, is being given careful attention by the field committee. And it is conceded that all operators experiencing trouble of any nature are doing all in their power in an effort to correct troublesome conditions and to date no recommendations have been made to apply to any particular well.

At the Fort Worth meeting of the Hendricks Pool operators it was decided the field committee's powers would be limited strictly to advisory powers. But in the event serious objections arose between an operator and the committee the matter would be referred to the railroad commission as one to be threshed out by the commission and the operator voicing an objection.

Fifteen of the sixteen operating companies in Hendricks were represented at the meeting and the representative absent was unavoidably detained. The casing regulation was signed by 12 of the

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Yates Pool is Extended to the West

West Texas Production Soars to 300,000 Bbls., a New Peak. Hendricks Pool, Winkler County, Continues to Climb

By James H. Dameron
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Feb. 20.—West Texas went on parade during the past week. Yates was extended three-quarters of a mile to the west, West Texas production soared to a new peak of 300,000 bbls., as Winkler County continued to climb sensationally and numerous other developments gave color to the picture.

Monday morning's gauge showed the Hendricks Pool had climbed to a new peak of 131,116 bbls. from 77 wells. The day before the production was 128,088 bbls. from 74 wells. Despite the fact water intrusion is showing a tendency to travel vertically and laterally the most conservative are revising their estimates of Hendricks' peak and adding 25,000 bbls. Prior to Monday morning's gauge 150,000 bbls. peak was considered a conservative estimate, but an additional 25,000 bbls. has been tacked on.

Production by companies for the 24-hour period ending February 20 was as follows:

Company—	Wells	Production
Atlantic Oil Prod. Co.	5	14,638
Cranfill & Reynolds	3	5,373
Gulf Production Co.	6	12,784
Humble Oil & Refg. Co.	6	14,540
Independent Oil & Gas Co.	8	12,305
Landreth Production Co.	4	10,623
Magnolia Petroleum Co.	4	3,325
Murchison Oil Co.	4	1,325
Pure Oil Co.	5	1,965
Republic Oil Co.	1	9,120
Roxana Petroleum Corp.	9	22,815
Southern C. O. P. Co.	15	13,185
Texon Oil Co.	3	3,985
Turman & Maxwell	4	5,133
Totals	77	131,116

Water encroachment in Hendricks has virtually the top of the structure as now defined, and the biggest well in the field on the basis of a 1-hour gauge has been shut in as a result of water reaching it. It is Roxana Corp.'s No. 1-B Hendricks, SW cor. NE, Section 41, Block B-5. It was making 10 per cent b.s. and water when shut in awaiting the erection of a treating plant. Three locations north Atlantic Co.'s No. 1-E Hendricks was making about 8 per cent water. Offsetting Roxana Corp.'s No. 1-B Independent Oil & Gas Co.'s No. 1 Vardeman is also cutting about 8 per cent. It is significant to note that the Roxana well was being produced under pinched conditions. On a 1-hour gauge the well made 1,115 bbls. when it was drilled in.

Water May Force Pinching

Many observers do not doubt that Hendricks will produce a large volume of crude, but they are of the opinion the water situation will force the pinching in of a great many of the wells and thereby keep production from literally flooding the market. It is probable that 30 new wells will be completed in Hendricks within the next 30 days. There are 129 operations in the field.

A new outbreak of surface water breaking out around the pipe in producers causing water wells to flow was reported late in the week. Humble Oil & Refining Co.'s No. 3-A Hendricks in Section 34, Block B-5, an 80,000,000-foot gas well under 1,000 lbs. back pressure, was pinched and a short while later a water well started flowing. It is believed the pinching in of this well forced the surface water out into adjoining wells.

One of the late completions of the field is Independent Oil & Gas Co.'s No. 5-A Hendricks, SW cor. W half SW, Section 34, Block B-5, which came in Sunday making 130 bbls. per hour at 2,935 feet. In the southern part of the field Sheldon & Burden's No. 1 Ida Hendricks, SW cor. SE, Sec. 28, Block B-5, was bottomed at 3,243 feet. The hole was bailed dry and 160 feet of oil rose in the hole in 14 hours. It is planned to give the well a shot.

Over to the northeast Amerada Petroleum Corp.'s No. 1 Walton, SW cor. NW, Section 48, Block 26, has been drilled to 2,426 feet and is still making 15,000,000 feet of gas and spraying a little oil. Difficulty is being experienced in getting the bailer to the bottom in an effort to bail out. The diagonal southwest offset, Southern Crude Oil Purchasing Co.'s No. 1 Hutchins, was shut down in lime at 2,484 feet.

A mile and a half north of production Atlantic Oil Producing Co.'s No. 1-F Hendricks, NE NW NW, Section 40, Block 26, is still trying to shut off a big flow of gas in order to drill deeper. Cranfill & Reynolds' No. 1-C Hendricks, the north offset, is also having difficulty in shutting off an estimated flow of 60,000,000 feet of gas at 2,728 feet.

Much has been said concerning the distress crude in Hendricks. Some contending there is plenty available while others contend there was little distress crude available in the field. Monday Landreth Production Co. closed a contract with the Crystal Oil & Refining Co. of Shreveport to supply 1,500 bbls. daily beginning March 1, 1928, and continuing throughout the year. It is reported the Crystal Corp. will pay the Humble Co.'s posted price, which is 60 cents a bbl. at present, for the oil f.o.b. at the Landreth Corp.'s loading rack at Monahans.

Yates Pool Extended

The Yates Pool, in Pecos County, was extended to the west when Phillips Petroleum Co.'s No. 1 M. A. Smith, near the center of Section 39, Block 194, made 5 heads in 24 hours from a total depth of 1,350 feet. The well is estimated good for 250 bbls daily in its uncompleted stage. It is shut down awaiting the erection of storage. It had a show of oil in lime at 1,319-22 feet after topping the lime at 1,220 feet. The well headed at 1,322 feet. It is 130 feet in the lime and 95 feet in the pay and not as deep as the nearest producer to the east. Phillips' well is not showing any water while the nearest production to the east is showing water. The well is the Phillips Co.'s first producer in the Permian Basin. Not without importance, however, was a three-quarter-mile extension of proven acreage for the Mid-Kansas and Transcontinental Oil Co. The extension in proven acreage was made when the Mid-Kansas and Transcontinental Co.'s No. 1-F Yates in the west part of Section 63 made 117 bbls. in 24 hours through one 4-inch line.

California presented itself with a valentine last week by completing the biggest gusher in Yates during the month. That company's No. 12 I. G. Yates in Section 34, Block 194, had an initial production of 1,330 bbls. per hour from pay at 1,200-90 feet.

Reagan County Active

Activity is on the increase in Reagan County. Marland Oil Co. and California Co. are both rigging up to test out the find of the Skelly Oil Co., 5½ miles south of the Big Lake Field. Skelly Oil Co. and Utah Southern Co.'s No. 1 University, SW cor. of Section 33, Block 8, averaged 25 bbls. on the pump last week. The same operators have made locations for another test in the SE NE SE, Section 35, Block 8, about a mile west and slightly north of the discovery well.

Another well of merit is Texon Oil & Land Co.'s No. 1-B University, NW cor. SW, Section 36, Block 9, which is the deepest well in the Mid-Continent. It has 2,000 feet of oil in the hole and is drilling below 7,580 feet.

In Runnels County Vacuum Oil Co., Lon Ladd and others is not showing up so well. The well had the pay at 2,514-16 feet and swabbed 55 bbls. the first 30 minutes. After setting over night it made 30 bbls., then it swabbed 40 bbls. after setting 8 hours. On the last run of the swab it showed water and the bailer was run showing salt water and cut oil.

It is believed the water is coming through a leak in the casing. Late in the week the well swabbed 115 bbls. in 12 hours with about 3 per cent water showing. This gauge was made after the 6-inch casing had been underreamed from 2,504 to 2,512 feet. It is planned to deepen the well slowly and the Vacuum Co. is scheduled to start two more tests in the near future.

A lease trade in the Yates Pool was reported Monday involving Pure Oil Co. acreage which was to be a part of the acreage deal in the sale to The Texas Company, which fell through. McMan Oil & Gas Co. purchased from the Pure Co., Section 25, Block 194, and Section 104, T.C.R R. Survey. Both McMan and Marland Oil Co. and Simms Oil Co. have offset production to the southwest of Section 104. This production has been in for three weeks but Pure Co. has not started any wells on its lease.

Pipe Line Construction

Pipe line construction work is moving forward at a rapid pace in West Texas. Illinois Pipe Line Co.'s 125-mile line from Del Rio in Val Verde County, running east to intersect the Humble Pipe Line Co.'s system at Lytle Station, is almost completed. One hundred miles of the line is complete and five stations have been built.

Shell Pipe Line Corp. has about 100 miles of its main line system from McCamey to Healdton, Okla., in the ground. Texon Oil & Land Co.'s line from Winkler to the Texas & Pacific Railroad in Ward County is being tested with water. Humble Pipe Line Co.'s 8-inch line from McCamey to the Hendricks Pool is expected to be completed by March 1. It wil provide an additional 25,000-bbl. daily outlet from Hendricks.

Shell Pipe Line Corp. has started construction work on the erection of its 1,000,000-bbl. concrete oil storage tank at Monahans in Ward County. The big reservoir will be 525 feet long, 504 feet wide, 36 feet high from the roof to the floor in the center and 26 feet high at the eaves. The concrete will be specially treated.

Tank car shipments out of Hendricks are averaging around 50,000 bbls. daily. The total deliveries from 10 West Texas counties during January amounted to 6,121,800 bbls., which included tank car shipments as well as trunk line shipments. The total stocks in West Texas on February 1 totaled 17,183,800 bbls.

WEST TEXAS COMPLETIONS

Crane County

Pure Oil Co.'s No. 1 University, Section 38, Block 30, is an abandoned location.

Culberson County

James H. Gardner's No. 1 Hadford, C SE, Section 29, Block 62, has junked the hole at 750 feet.

Howard County

Coyle-Concord Oil Co.'s No. 3 Dora Roberts, Section 156, Block 29, topped the pay at 1,854 feet and was drilled to a total depth of 1,884 feet. After a 40-

(Continued on Page 186)

WILDCAT OPERATIONS IN WEST TEXAS

Week ending February 18, 1928

Company, farm and location—	Remarks—
ANDREWS COUNTY	
George B. Calvin's (was Calvin & Belt's) No. 1 Ratliff & Bedford, C NE Sec. 16, Blk. A-54	Hole full fresh water 1,055 ft.; top salt 1,610 ft.; shut down 4,003 ft.
J. S. Cosden's No. 1 Ratliff & Bedford, C SE Sec. 8, Blk. 73, Public School Land	Top salt 1,585 ft.; shut down 4,116 ft.; will deepen.
Deep Rock Oil Co.'s No. 1 W. J. Harris, C SE Sec. 12, Blk. A-46, Public School Land, elev. 3,167 ft.	Hole full fresh water 1,050 ft.; top salt 1,690 ft.; shut down 2,770 ft. for casing.
B. B. McKennon's (was Neff et al's) No. 1 J. S. Means, C SE Sec. 12, Blk. A-35, Public School Land	Set 8-in. 1,580 ft.; top salt 1,930 ft.; drlg. 3,280 ft.
BORDEN COUNTY	
Dixon Creek Oil Co.'s No. 1 Clayton & Johnson	Set 15½-in. casing 375 ft.
Marland Oil Co.'s No. 1 G. E. McDavid, C SW Sec. 156, Blk. 25, H. & T. C. Survey,, elev. 2,310 ft.	Top lime 2,410 ft.; drlg. 2,650 ft.
Marland Oil Co.'s No. 1 Alexander Murphy, C SW Sec. 66, Blk. 25, H. & T. C. Sur. (3,250-ft. test)	Location.
BREWSTER COUNTY	
Cowden & Bowser's No. 1 Jackson & Harmon, C N half Sec. 1, Blk. 331	Drlg. 310 ft.
J. M. Hickey's No. 1 Jackson & Harmon, NE cor. Sec. 182, Blk. 9, G. H. & S. A. Sur.	Shut down 910 ft.
Mid-Kansas O. & G. Co.'s No. 1 Turney, Sec. 77, Blk. 213, T. & St. L. Sur.	Drlg. 2,790 ft.
Reese & White's No. 1 Kimbale, C NE Sec. 204, Blk. 9, G. H. & S. A. Sur.	Shut down 1,390 ft.
Van McPhail's No. 1 McIntyre, SE cor. Sec. 59, Blk. 352, 7 mi. S of Alpine	Shut down 1,575 ft.
Wilcox & Anderson's No. 1 Gage, Sec. 8, Blk. 300, T. C. R. R. Sur.	Underreaming 1,901 ft.
COKE COUNTY	
W. H. Brown et al's No. 1 W. L. Foster, SE cor. Sec. 142, Blk. 2, H. & T. C. Sur., elev. 2,222 ft.	Run. 6-in. casing 3,180 ft.; drlg. 3,212 ft.
Lipan Oil Co.'s No. 1 S. M. Conner, Sec. 71, Blk. 2, H. & T. C. Sur.	Show oil 1,224-34 ft.; shut down lime 3,317 ft.
Lipan Oil Co.'s No. 1 E. C. Rawlings, Sec. 390, Blk. 1-A, H. & T. C. Sur., elev. 2,750 ft.	Total depth 2,736 ft.; shut down.
CONCHO COUNTY	
Parks & Lawson's No. 1 Schultz	Show oil 925 ft.; shot with 40 and 30 qts.; no results; shut down 1,500 ft.
The Exploration Co.'s No. 1 Hartgrove, Blk. 240, J. Schouch Sur., elev. 1,718 ft.	Set 10-in. 760 ft.; shut down 940 ft.
Sartain Oil Co.'s No. 1 Evridge	Spudded and shut down.
CRANE COUNTY	
Crane Dev. Co.'s No. 1 J. R. Mosley, S cor. Sec. 18, Blk. 6, H. & T. C. Sur.	Top salt 819 ft.; drlg. 2,498 ft. ft. and 2,450-62 ft.
Gulf Prod. Co.'s No. 3 W. N. Waddell, SE cor. NE Sec. 3, Blk. B-25, Public School Land	Top lime 3,050 ft.; show oil 3,245-49 ft.; drlg.
J. K. Hughes Dev. Co.'s No. 1 State Bank Commission, CSL Sec. 18, Blk. 4, H. & T. C. Sur.	Location.
Olderhouser's No. 1 Musleny, SW Sec. 18, Blk. 6	Drlg. 2,530 ft.

(Continued on Page 138)

Positive Safety in Handling Long Strings

Continued drilling to greater depths demands an extraordinary degree of safety in rotary and casing elevators—a fact we recognized long since and have provided in Dunn Super-Safety Elevators in a superlative degree.

These elevators have been used on many of the deepest oil wells ever drilled, successfully handling the extra weight of the longest strings, and providing the highest factor of safety and speed in operation.

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Seminole Continues Its Slow Decline

Material Decrease Expected Within 60 Days. Offset to Prairie's Big Well in Earlsboro Pool a Disappointment

By J. L. Dwyer
Staff Correspondent, Oklahoma Fields

Last week was exceptionally quiet in the fields in Oklahoma with a decline in output of all pools in the Greater Seminole area, the improvement of a well which extends the Lovell region of Logan County, and the disappointing feature of the offset well to the Prairie Oil & Gas Co.'s big producer at Earlsboro as the most interesting news. The Oklahoma crude market continues rather strong in spite of the crude price reduction on the low gravities of oil which was announced by the Magnolia Petroleum Co. during the week. This production was especially felt by the producers of the southern part of the State where high gravity oil is a rarity.

The decline in the Seminole Field was general in nature, and seemed to be spread out all over all sections of the pool with no startling drops in the output of any one region or any group of leases. The field on Saturday of last week produced 313,211 bbls., the lowest figure which it has made on any one day since it started on the upward trend last summer. The regions which are now producing should register further declines for the time being, and it is reasonable to expect that they will be making 250,000 bbls. daily some time within the next 60 days.

The country around the Little River Pool, and immediately south of that pool, resembles the rush which was witnessed when the famous old Cherokee Strip in Oklahoma was opened many years ago. The rigs which are out in the field number about 60, and they are located at points where a short trip is required to place them on their location. There are several rigs now on location, awaiting only for the opening date of March 1 to start their construction. The extremely bad nature of the roads in this region is partly responsible for the desire of the operating companies to place the rigs as close to the location as possible, for should rainy weather be experienced, this part of the country would be turned into a swamp.

Offset Disappointing

In the older pools of Seminole, the shooting is practically over except in the cases of new production. The east side of Earlsboro where the Prairie Oil & Gas Co. recently disturbed the tranquil atmosphere by completing No. 5 Davis, SE cor. NW NW, Section 13-9-5, which made 7,000 bbls. after a shot of 20 quarts in the Wilcox sand, received a setback when the offset well, Carter Oil Co.'s No. 2 Davis, NE cor. SW NW, Section 13-9-5, made only 560 bbls. daily after a shot of 20 quarts and also being placed on air. The limited production of the Carter well influences the thought that this part of the field is a very small high which will cover only a limited area. The Carter well had the sand at 4,362-68 feet. The Prairie's Davis lease covering 40 acres in the NW NW, Section 13-9-5, had three good locations on it in Nos. 1, 3 and 5, which were all shot, and it is thought that these three locations will form the best part of this small high.

In the Earlsboro Pool the Atlantic Oil Producing Co., the Sinclair Oil & Gas Co. and J. J. Deaner have a good well in the Hunton lime in No. 2 Foreman, NW cor. SW NW Section 18-9-5, which is making some flows from 4,244-45 feet. This well filled up 700 feet in the 8-inch hole the first hour after the sand was tapped, and began flowing. It is estimated at 500 bbls. as it now stands, and has been shut down pending the construction of additional tankage. It will be deepened.

In the Lovell area of Logan County the Roxana Petroleum Corp.'s No. 1 Freelove, SW cor. SW Section 17-19-4w, is making 580 bbls. per day from the Wilcox sand. Just where the top of the Wilcox was encountered is not definitely known, but the best pay was found from 6,082-84 feet, corrected measurement. According to available data, this well is running some 40 feet lower than the other wells in the pool, but the great depth and the crooked holes which undoubtedly have been drilled in this pool may have some influence upon the exact depth of the sand in the various parts of the field. The Freelove well extends the producing limits of the Lovell Pool, 1 mile to the north, and leaves ample territory which looks good. The Twin State Oil Co. and the Sinclair Oil & Gas Co. have leases adjacent to this well, and are drilling. The largest part of the acreage in this area is owned by the Roxana Petroleum Corp. who opened the pool last May. The discovery well is still making 2,100 bbls. after nine months of flowing. The failure of wells to the south and to the east of the discovery well may be taken as indicating that the best results are to be expected in the area between the discovery well in Section 30-19-4w and the Freelove well. The 6,000-foot depth and the current prices of the oil produced will have a tendency to slow up operations in this region.

Pearson Switch Area

The Pearson Switch area of Pottawatomie County is active, and the mystery well of the Indian Territory Illuminating Oil Co. in Section 25-7-3 is declining. This well, No. 1 Sullivan, SW cor. NW SE Section 25, come in three weeks ago and had an initial output of 2,700 bbls. It was believed to be producing from the Viola lime, although some fragments of sand were found which were though to have possibilities of being Simpson sand. There have been no such large wells found in the Viola to date. The offset well, Magnolia Petroleum Co.'s No. 1 Harper had been making 300 bbls., and went dead upon the completion of the Sullivan well. After two weeks of effort, the Harper well was revived, and is now making better than 900 bbls. daily. As this well increased, the Sullivan we'l registered a decline, and is now making 1,600 bbls. daily. The freakish performance of these two wells has added further doubt as to the origin of the oil. It is reported that both of the wells will be placed on the air-gas lift system of producing.

Carter County

Magnolia Petroleum Co.'s No. 2 Carter, SW cor. SE SW, Section 14-1s-3w, made 181 bbls. from sand at 2,365-2,415 feet.

Magnolia Petroleum Co. made location for No. 1 Ragsdale, SW cor. Section 5-2s-3w.

Bryan County

Magnolia Petroleum Co. has a machine drilling at 150 feet on No. 2 Marshall, SW cor. NW NW SW, Section 26-5s-7.

Creek County

Devonian Oil Co. made location for No. 6 Bigpond, SW cor. NW SW, Section 36-15-7. Gled Oil Co.'s No. 1-A West, NE cor. SW NW, Section 17-18-9, is cleaning out at 3,190 feet preparatory to deepening. Pure Oil Co.'s No. 12 Crow, CNL SE SE, Section 26-18-12, is drilling deeper at 2,100 feet. T. J. Wood and others' No. 3 Charcotenne, NE cor. NW SE, Section 21-17-9, is cleaning out at 2,975 feet to deepen. Jackson & Wise moved a machine out for No. 3 Thomas, SW cor. NW, Section 13-17-10. Skelly Oil Co. and others' machine is at the location for No. 1 Dickson, NW cor. SW, Section 19-17-10. S. J. Smith and others moved a machine to the location for No. 5 Fife, NW cor. SE, Section 4-17-11. Sterling Oil & Gas Co.'s No. 1 Leenun, NE cor. SW, Section 4-17-11, is spudding. Winemiller and others' rig is up for No. 2 Deenun, SW cor. NE, Section 4-17-11. G. D. Roberts has the rig up for No. 1-A Panoske, SW cor. Section 2-15-10. Elsoj & Detrick's rig is up for No. 1 Morton, SE cor. NE SW, Section 27-14-10.

H. U. Bartlett's No. 1 McIntosh, NE cor. NW NW, Section 28-18-9, made 15 bbls. from Bartlesville sand at 2,620-36 feet. Hemlock Oil Co.'s No. 1 Thomason, NW cor. NE SW, Section 35-18-10, is dry and abandoned at 2,497 feet in the Dutcher sand. Chief Drilling Co.'s No. 1 Brown, SE cor. Section 1-17-10, had Wilcox sand at 2,833-68 feet and is dry and abandoned. L. & D. Oil Co.'s No. 2 Townlot, SE cor. NE NE, Section 23-17-10, has been abandoned at 2,550. J. Winemiller and others' No. 1 M. Deenun, SE cor. NW, Section 4-17-11, had Red Fork sand at 1,526-67 feet and made 275 bbls. after a shot of 65 quarts. H. C. Wilson's No. 1 Miles, NE cor. NW, Section 10-15-8, is dry and abandoned at 3,241 feet.

Coal County

Galbreath and others made location for No. 1 Brown, SW cor. SE, Section 24-1-9.

Garvin County

Magnolia Petroleum Co.'s No. 2 Ringer, SE cor. NW NE NE, Section 15-1-3w, is drilling at 1,565 feet.

Grant County

Tom Palmer and others made location for No. 1 Lupton, SW cor. SE, Section 26-28-3w.

Kay County

Royal Oil & Gas Co.'s No. 1 Kelle, C SW SE, Section 33-28-1, is drilling at 200 feet. Industrial Oil & Gas Co. made location for a shallow gas test in C SE NE, Section 2-27-1w. Nehr & Wison's No. 1 Bersche, SW cor. SE, Section 4-27-1, is drilling for gas at 200 feet. Royal Oil & Gas Co.'s No. 1 Brazelton, C NW SW, Section 5-27-1, is ready to drill in at 821 feet.

Harris & Haun's No. 2 La Mar, NE cor. NW SW, Section 22-29-1w, is dry and abandoned at 2,160 feet. Greer & Walters' No. 2 Skein, C NW SW, Section 19-29-1, has been abandoned at 1,560 feet. Empire Oil & Refining Co.'s No. 1 Swenson, SW cor. SE, Section 29-29-1, has been abandoned at 3,593 feet. Harris & Haun's No. 2 Hobough, SW cor. Section 30-29-1, has been completed for 1,000,000 feet of gas in sand at 941-47 feet. The Prairie Oil & Gas Co.'s No. 1 School Land, SE cor. SW NW, Section 36-28-1w, has been shut in for 500,000 feet of gas in sand at 594-676 feet.

Logan County

Ramsey Brothers' No. 1 Quigley, NE cor. SE NW, Section 28-18-4w, has been abandoned at 1,000 feet.

Noble County

John White and others' No. 1 Cooper, C NW SW, Section 5-24-1w, is drilling at 350 feet.

Osage County

Carter Oil Co. has the cellar dug for No. 8, NW cor. SE SE, Section 3-26-6. The cellar has been dug for No. 9, SW cor. NE SE, Section 3-26-6. Indian Territory Illuminating Oil Co. made location for No. 388, NW cor. SE, Section 13-26-10. Osage Oil Syndicate's No. 1, NW cor. NE, Section 1-21-8, is rigging up. The Prairie Oil & Gas Co. is building the rig for No. 4, SW cor. SE SW, Section 21-27-6. The rig is under construction for No. 5 Stewart, CSL NW, Section 21-27-6.

Phillips Petroleum Co.'s No. 7, NW cor. SE, Section 17-27-6, made 600 bbls. in 16 hours from Burbank sand at 2,885-2,951 feet. Gypsy Oil Co.'s No. 4, SE cor. NE NW, Section 28-27-6, was completed for 135 bbls. in Burbank sand at 2,924-32 feet and broken sand at 2,932-76 feet. Kewanee Oil & Gas Co.'s No. 1, SE cor. NE, Section 28-27-6, made 190 bbls. in 10 hours from Burbank sand at 2,896-2,955 feet. No. 6, NW cor. NE, Section 28-27-6, flowed 1,602 bbls. from Burbank sand at 2,900-78 feet. Carter Oil Co.'s No. 4, SE cor. Section 3-26-6, has been completed for 357 bbls. in Burbank sand at 2,850-2,924 feet. McCuen, Wormser and others' No. 1, SW cor. NW, Section 15-24-8, is dry and abandoned at 872 feet. Delmar Oil Co.'s No. 1, CWI. E half NE, Section 4-23-10, has been abandoned at 2,263 feet. New England Oil & Pipe Line Co.'s No. 1, SE cor. SW, Section 17-23-10, was shot with 30 quarts and made 5 bbls. from sand at 2,593-91 feet. Mid-Kansas and Devonian Oil Co.'s No. 1, SW cor. SE NW, Section 27-21-10, made 10 bbls. from the Peru sand at 1,530-51 feet.

Payne County

Payne County Gas Co.'s No. 2 Knott, NW cor. SE SE, Section 7-18-4, made an initial of 125 bbls. from sand at 4,250-86 feet.

Pawnee County

Markham & Shoefeldt's No. 2 McClure, NE cor. SE SW NE, Section 9-20-9, has been abandoned in Wilcox sand at 2,790-2,804 feet. Turner and others' No. 2 Smelser, NW cor. NW SW SW NW, Section 29-20-9, is making 100,000 feet of gas from sand at 1,093-1,124 feet.

Pontotoc County

C. B. Shafer has rotary rig up for No. 6 Yoakum, Section 16-5-8, Allen Pool. Homaokla Oil Co. has a rotary rig up for No. 9 McCall, NE cor. Section 17-5-8. W. R. Ramsey's No. 4 Milner,

WILDCAT OPERATIONS IN OKLAHOMA

NORTHERN OKLAHOMA

GRANT COUNTY

Otstet Development Co.s No. 1 Snyder, NE cor. NE Sec. 6-28-3w ..... Shut down 4,518 ft.
J. V. Bailey and others' No. 1 Maddox, C SE Sec. 18-27-5w ..... 2,000,000 ft. gas 4,835-37 ft., cleaning out to deepen.
Thraves and others' No. 1 C. D. Fuss, SW cor. NW NW Sec. 30-27-4w ..... Shut down 1,230 ft.
Burns & Beasley's No. 1 Bolsterton, SW cor. NW SW Sec. 24-27-3w ..... Rig.
Brasil & Moses' No. 1 Goutier, SW cor. NW Sec. 34-26-4w ..... Shut down for pipe 650 ft.
Lambert and others' No. 1 Tabor, SE cor. NE SE Sec. 23-26-3w ..... Spudded and shut down.
Cowden and others' No. 2 Vollmer, CEL NE SW Sec. 22-25-4w ..... Fishing 5,640 ft.

HARPER COUNTY

Kopisch Oil Co.'s No. 1 Johnson, NE cor. SE Sec. Hoffer Oil's No. 1 Cooper, NW cor. SE SE Sec. 12-25-22w.. Shut down 4,182 ft.
24-27-21w ..... Rigged up and shut down.

WOODS COUNTY

Sooner State Oil Co.'s No. 1 Marcum, C SW Sec. 20-27-15w ..... Spudded and shut down.
Victor Oil Co.'s No. 1 Buskirk, SW cor. SE Sec. 10-

(Continued on Page 151)

More barrels of cracked gasoline were produced by the Dubbs Process in 1927 than in any previous year

More in the last quarter of 1927 than in any other quarter

More in December than in any previous month

This is the record—in the face of general curtailment of refinery operations

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

SE cor. Section 18-5-8, is drilling deeper at 2,376 feet. Lewis & Clark moved a machine out for No. 1 Walton, C SW SW, Section 7-3-7.

Conservative Oil Co.'s No. 1 Norris, NE cor. NW, Section 28-5-6, has been abandoned at 2,709 feet in the Hunton lime found at 2,690 feet. Louisiana Oil Refining Co.'s No. 12 Perry, NE cor. Section 19-5-8, made 150 bbls. from sand at 2,554-95 feet. W R. Ramsey's No. 1 Shipley, NW cor. NE SW, Section 21-5-8, is dry and abandoned at 3,000 feet.

Tulsa County

Glidden & Holmes' No. 1-A Johnson, SW cor. NE, Section 15-19-11, is spudding. Holmes and others' No. 1 Unallotted, NE cor. Section 31-19-11, is spudding. Berry and others moved a machine out for No. 3 Funk, NW cor. NE, Section 3-16-12.

Holmes and others' No. 1 Ragan, SE cor. NE SE, Section 22-19-10, is dry and abandoned after drilling Wilcox sand at 2,435-55 feet. Regal Oil & Gas Co.'s No. 4 Mitchell, CEL W half SE, Section 5-19-11, has been abandoned at 2,337 feet. E B. George and others' No. 1-A Brown, NW cor. SW, Section 7-17-13, made a 25-bbl. well in the Dutcher sand at 1,859-76 feet. Enfisco Oil Corp.'s No. 1 Allen, C W half NW, Section 14-17-13, is dry and abandoned at 1,980 feet.

Grady County

Meridian Gas Co.'s No. 5-A Farwell, NW cor. NE SE, Section 23-5-8w, is rigging up rotary tools. Oklahoma Gas Utilities Corp. has the rig timbers on the ground for No. 9 Farwell, NE cor. Section 26-5-8w, Chickasha gas field. Rig timbers have also been moved out for No. 10 Farwell, SE cor. NE NE, Section 26-5-8w. The rig is on the ground for No. 11 Farwell, NE cor. SE NE, Section 26-5-8w.

Oklahoma Gas Utilities Corp.'s No. 8 Farwell, NW cor. SW NE, Section 26-5-8w, has been shut in for 49,000,000 feet of gas at 2,400 feet. Little Nick Oil Co.'s No. 4 McCaughtry, NE cor. NW NW, Section 35-5-8w, cemented 8-inch casing at 2,027 feet, drilled to 2,400 feet and is good for 36,000,000 feet of gas. J. J. Hall's No. 1 Woods, SW cor. Section 1-4-8w, set pipe at 2,255 feet, drilled to 2,375 feet and gauged 19,000,000 feet of gas. The Prairie Oil & Gas Co.'s No. 4 Dryden, SE cor. NE Section 3-4-8w, has been abandoned at 2,447 feet. Galton Camp's No. 1 Soloman, SW cor. Section 25-4-8w, has been completed for 4,500,000 feet of gas at 2,094 feet.

Hughes County

Winkler & McQueen's No. 1 Tyger, C SW SE, Section 31-5-9, is dry and abandoned at 2,955 feet.

Jefferson County

Heydrick and others moved the timbers out for No. 1 Spring, SW cor. NW SW, Section 24-6s-6w.

McIntosh County

Beggs Oil & Gas Co. has the rig up for No. 3 M. Bray, C SE SE, Section 3-12-15.

Muskogee County

Bryan & Emery's No. 1 Lowery, NW cor. SW NW SW, Section 9-15-15, is drilling deeper at 1,705 feet. D. L. T. Oil Co has the machine at the location for No. 2 Mackey, SE cor. SW SW, Section 9-15-18. C. D. Bradley and others' machine is at the location for No. 1 Rogers, NW cor. SE, Section 21-15-19. Joe Paul and others moved a machine out for No. 3 James, SW cor. NW SW, Section 17-14-17. J. F. Blackwood and others' No. 1 Bennett, SE cor. NE SW, Section 6-14-19, is rigging. Hale-Ford Oil Co.'s No. 3 Clark, SE cor. NW SE, Section 6-14-19, is spudding.

P. Boyle and others' No. 1 Lowery, SW cor. NW NW SW, Section 9-15-15, made 15 bbls. from sand at 1,620-24 feet. J. M. Foltz' No. 1-A Woodall, SE cor. SW NW, Section 20-15-16, has been completed for 4,000,000 feet of gas in sand at 1,193-1,200 feet. J. L. Haner's No. 2 Stidham, SW cor. Section 9-15-18, is good for 2,700,000 feet of gas in sand at 777-802 feet. J. L Dixon's No. 5 Callahan, C SE, Section 2-14-18, is dry and abandoned at 1,944 feet. J. A. Evans and others' No. 1 Thompson, SW cor. NW SW, Section 2-14-19, is dry and abandoned at 478 feet. J. D. Linthecum's No. 2 Kelley, SW cor. NE SE, Section 5-14-19, has been abandoned at 685 feet. Towner & Witt's No. 4 Crittenden, SE cor. SW NE, Section 6-14-19, was drilled to 497 feet and abandoned.

Okmulgee County

Harsha & Delaney moved the rig out for No. 1-A Harrison, SW cor. NW, Section 35-16-14 Thompson & Black staked the location for No. 1 Scott, SE cor. NW SE, Section 28-15-11. C. E. Love and others moved a machine out to drill No. 2 Brown, SE cor. NE SE, Section 15-15-12. Peterson and Darby Petroleum Co. have a machine at the location for No. 1 Asbury, Section 8-15-14.

Carr Peterson's No. 5 E. Ware, NW cor. SW, Section 9-15-14, has been completed for 15,000,000 feet of gas in sand at 1,826-41 feet. E. P. Jones and others' No. 1 Jones, C SW NE, Section 14-14-13, has been abandoned at 1,932 feet Amerada Petroleum Corp. and others' No. 1 Farmer, SW cor. SE, Section 7-14-11, is dry and abandoned at 3,076 feet. A. C. Saint and others' No. 1-A Warren, NE cor. SW NW, Section 12-14-12, was deepened from 2,108 feet to the Wilcox sand at 2,750-59 feet and abandoned.

Okfuskee County

Henry Oil Co. and others' rig is up for No. 1 Sears, SE cor. NE, Section 5-11-11. Riverland Oil Co. has the rig on the ground for No. 2 Barnett, CSL SE SW, Section 19-11-11. Minnehoma Oil Co. has built the rig for No. 3 Holmes, CNL NE NW, Section 30-11-11. Schermerhorn Oil Co. has moved the rig out for No. 1 Norris, C SE NW, Section 20-10-9.

Champlin Oil & Refining Co.'s No. 2 Ingram, NW cor. SW SW, Section 14-11-11, Deaner-Lyons Pool, made 225 bbls. from Wilcox sand at 3,508-30 feet. Moffit and others' No. 5 Holmes, NE cor. NW NE, Section 7-11-12, made 10 bbls. from sand at 1,950-73 feet. Phillips Petroleum Co. and others' No. 1 Tecumseh, NW cor. NE NW, Section 21-10-9, topped Papoose sand at 3,270 feet, drilled to 3,278 feet and is making 30,000,000 feet of gas.

Pittsburg County

Quinton Spelter Co.'s No. 1 Houston, NE cor. Section 17-7-18, has been completed for 15,000,000 feet of gas in sand at 2,000-60 feet.

Pottawatomie County

Indian Territory Illuminating Oil Co. has the rig on the ground for No. 2 Sullivan, NW cor. SE, Section 25-7-3, Pearson Pool. Wilcox Oil & Gas Co. made location for No. 1 Wyatt, SE cor. NE NW, Section 10-7-4. T. B. Slick made location for No. 1 School Land, SE cor. Section 16-6-5.

Wilcox Oil & Gas Co.'s No 1 Pickard, SE cor. SW, Section 32-11-2, has been abandoned at 4,500 feet. Clark & Edwards and others' No. 1 School Land, NE cor. SW, Section 16-10-5, has been abandoned at 4,792 feet.

Seminole County

Snowden & McSweeney's No. 2 Epply, NW cor. NE, Section 15-10-8, is rigging up to deepen from the Cromwell sand to the Wilcox. Magnolia Petroleum Co.'s No. 2 Hyde, NE cor. SE NW, Section 13-9-5, Earlsboro Pool, is rigging up rotary tools. The Prairie Oil & Gas Co.'s No. 6 C. Davis, SE cor. NE NW, Section 13-9-5, is rigging up Sinclair Oil & Gas Co.'s No. 2 W. Taylor, NW cor. NE NE, Section 10-8-6, Bowlegs Pool, is a rig under construction. The cellar for No. 3 W. Taylor, SE cor. NE NE, Section 10-8-6, has been dug. Dixie Oil Co.'s No. 1 Lizzie, SW cor. NW NW, Section 11-8-6, is a rig on the ground.

Twin State Oil Co. made location for No. 4 Jones, NE cor. SE, Section 11-8-6. The rig is on the ground for No. 1 Marshall, SE cor. SW NW, Section 7-6-8. Mid-Continent Petroleum Corp. made location for No. 3 Fleet, NE cor. NW SE, Section 8-5-8. Magnolia Petroleum Co. moved the rig out for No. 1 Reed, NW cor. Section 17-5-8, Allen Pool.

Barnsdall Oil Co.'s No. 1 Sango, SE cor. NW, Section 1-9-5, Earlsboro Pool, had an initial production of 254 bbls. from Wilcox sand at 4,318-31 feet. No. 2 Ingram, NW cor. SW SW, Section 1-9-5, topped Wilcox sand at 4,598 feet, drilled to 4,599 feet and swabbed 473 bbls Shaffer Oil & Refining Co.'s No. 3 Clark, SE cor. SW, Section 1-9-5, is dry and abandoned at 4,570 feet. No. 6 Clark, NE cor. SE SW, Section 1-9-5, drilled Wilcox sand from 4,369 feet to 4,371 feet and plugged back to 3,586 feet where it flowed 1,027 bbls. from Earlsboro sand.

Twin State Oil Co.'s No. 4 Hearn, NW cor. NE SE, Section 2-9-5, made 800 bbls. from Wilcox sand at 4,351-65 feet. Magnolia Petroleum Co.'s No. 4 Edmundson, NE cor. SW SW, Section 3-9-5, lost the hole at 4,275 feet and has been abandoned. Independent Oil & Gas Co. and Darby Petroleum Co.'s No. 8 Knapp, SE cor NW NE, Section 8-9-5, has been abandoned at 4,504 feet. Independent Oil & Gas Co. and Margay Oil Co.'s No. 2 Gaines, NE cor. Section 11-9-5, swabbed 100 bbls. from Earlsboro sand at 3,503-38 feet, total depth 3,556 feet. Pure Oil Co.'s No. 6 Aldridge, NE cor. SW, Section 3-9-6, Searight Pool, had Wilcox sand at 4,507-10 feet, plugged back 4 feet and made 50 bbls. from Hunton sand.

Roxana Petroleum Corp.'s No. 3 Strothers, NE cor. SW NE Section 3-9-6, Searight Pool, has been completed for 149 bbls. after plugging back to 4,657 feet from 4,665 feet. Jarvis & Holm and others' No. 1 Butner, NE cor SW SW, Section 10-9-8, drilled to 3,532 feet and plugged back to 3,528 feet and completed for 60 bbls. Gypsy Oil Co.'s No. 4 Cudjo, SW cor. NE, Section 4-9-6, lost the hole and was abandoned at 4,698 feet. Sinclair Oil & Gas Co.'s No. 1 Taylor, SW cor. NE NE, Section 10-8-6, Bowlegs Pool, made 2,082 bbls. from Wilcox sand at 4,138-62 feet. Barnsdall Oil Co.'s No. 1 Hotulka, SE cor. NW SE, Section 22-7-6, swabbed 70 bbls. from Wilcox sand at 4,266-4,397 feet. Louisiana Oil Refining Co.'s No. 1 Punluste, SW cor Section 8-5-8, Allen Field, is making 1,183 bbls. from sand at 2,593-2,632 feet. No. 3 Reed, SW cor. NE NE, Section 18-5-8, made 604 bbls. from sand at 2,662-70 feet. Ramsey Oil Co.'s No. 1 Cully, NW cor. SE NE, Section 18-

(Continued on Page 129)

KANSAS WILDCATS

BARBER COUNTY

G. W. Basom's No. 1 Grant, SW cor. SE SW, Sec. 18-31-3 ..... Spudded.
Otstot et als' No. 1 Barlow, SE cor. SE, Sec. 22-33-3w 33-3w ..... Shut down 1,860 ft.
Rolland and others' No. 1 Pickens, NE cor. NW NE Sec. 27-30-14w ..... Shut down 3,196 ft.
J. K. D. Shaffer's No. 1 Carter, C SE SE Sec. 2-33-13w .. Drilling 3,593 ft.
J. K. D. Shaffer's No. 1 Boggs, SW cor. NE SW Sec. 19-33-12w ..... Cleaning out 4,465.

BARTON COUNTY

Everett & Wiley's No. 1 Ward, NW cor. SW Sec. 12-20-13w ..... Shut down 3,948 ft.
Huffine and others' No. 1 Smith, NE cor. SE NW Sec. 17-19-11w ..... Shut down 5,180 ft.

BUTLER COUNTY

Cress & Franks' No. 1 Bryson, NE cor. NE Sec. 26-27-5 .. Spudded and shut down.
Empire Gas & Fuel Co.'s No. 1 Semisch, NW cor. SE NW Sec. 4-28-7 ..... Rig.
La Robb and others' No. 1 Bronsenger, NE cor. SW Sec. 24-27-3 ..... Rig.
Joe Liggett's No. 1 Travender, NW cor. SE Sec. 24-28-6 .. Drilling 2,530 ft.
White Eagle Oil & Refining Co.'s No. 1 Dixon, NE cor. SE SW Sec. 1-27-6 ..... Hole full of water 3,099-3,105 ft.; shut down.
H. F. Wilcox Oil & Gas Co.'s No. 1 Littell, NE cor. SE NW Sec. 21-29-4 ..... Collapsed casing 1,458 ft.; shut down.

CHASE COUNTY

Griener & Fowler's No. 1 Carson, NE cor. NE Sec. 9-21-7 ..... Drilling 1,437 ft.

CLARK COUNTY

Skelly Oil Co. & Merriam's No. 1 Winter, C E Half Sec. 17-31-12w ..... Drilling 3,465 ft.

(Continued on Page 211)

LARGE HELIUM CONTENT REPORTED FOUND IN NEW KANSAS GAS WELL

By J. L. Dwyer
Staff Correspondent, Kansas Fields

The report that a well in Elk County, near the town of Moline, has found a sand which carries helium is the most interesting news which has originated in Kansas for some time. This well is No 1 Johnson, C NL NE NE Section 29-31-10, and was drilled by the Blaudell Oil Corp. which is composed of A. G. Blauner and Arthur O'Dell. The well topped a sand at 2,120 feet, and is making around 800,000 feet of gas believed to be helium Samples of this gas have been sent to the United States Bureau of Mines Experimental Station at Bartlesville, Okla., and government helium experts have been sent from Fort Worth, where a helium plant is maintained.

Unofficial reports state that the gas contains 3.4 per cent helium, and if this be true, it is said to be the richest helium gas which has been discovered to date. There is some helium gas produced along the Dexter anticline in Cowley County around Township 33-6 and a commercial plant at this location handles the product. The gas found in this area contains around 2 per cent helium. The Nocona Field of North Central Texas is the only other commercially developed helium field in the Mid-Continent, and the wells in this region make a gas which contains from 1¼ to 1¾ per cent helium.

Helium is a rare product and is used mainly by the United States Navy for dirigible balloons on account of its non-inflammable nature. Should the new well prove to be as good as reports indicate, another helium development will be started in this part of Elk County. The presence of a plant at Dexter which is 20 miles southwest of the new well, affords an outlet for the product without any further construction expense. The Theta Oil Co. has found some small showings of helium at a corresponding depth in wells drilled in the south central part of Township 31-10, east of the Blaudell well.

Anticipating further operations in western Kansas, the Phillips Petroleum Co. has opened offices at Russell, Kans., in Russell County.

A showing in a well 7 miles south of the Lost Springs area of Marion County has caused additional interest in that region. Skow Brothers' No. 1 Melcher, SE cor. SW NW, Section 20-18-4, is making some little gas, and has 800 feet of oil in the hole from sand 2,396-2,400 feet.

Butler County

Paul and others' No. 1 Fisher, NE cor. SW NE, Section 31-26-6, is dry and abandoned at 3,175 feet.

Chautauqua County

Griffeth, Bell and others' No. 1 Chaffine, SW cor. NE, Section 1-32-10, is drilling at 1,030 feet.

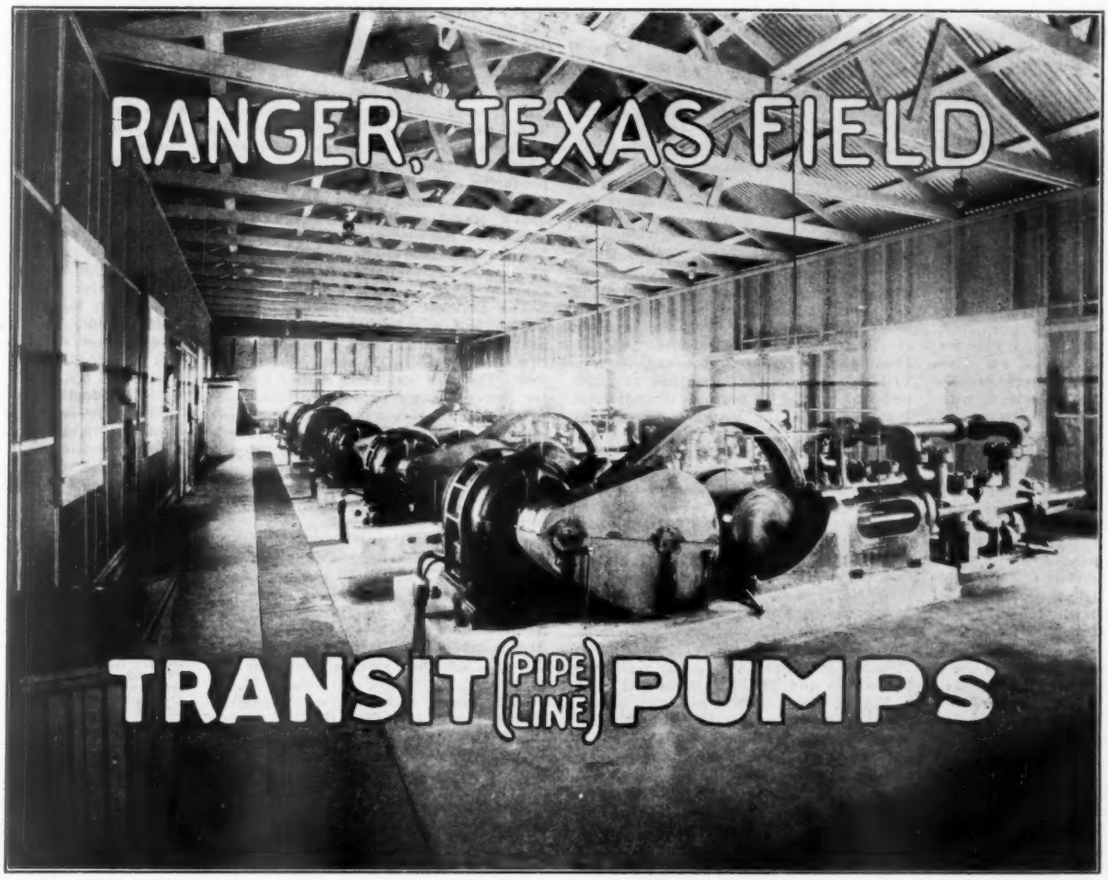
Coffey County

Garland and others' No. 1 Goff, NW cor. NE SE, Section 9-22-15, is dry and abandoned at 1,650 feet.

Cowley County

Shawver and others' rig is up for No. 1 Mullett, C NW SE, Section 31-34-3. Trees Oil Co.'s No. 2 Dickinson, SE cor. SW NE, Section 30-30-4, has been abandoned at 2,903 feet. Roth & Faurot's No. 1 Winfield Townsite, Lot 1, B'ock 11, Section 22-32-4, is making 3,000,000 feet of gas from sand 2,909-17 feet. Roth & Faurot's No. 1 Richardson, C SW

(Continued on Page 129)



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Gas Field Well Makes Big Flow of Oil

Test of Palmer Corp. in Bossier Parish, La., Starts at Rate of 6,000 Bbls. Fluid, 10% Water. Gas Wells Predominate

By D. H. Bancroft
Staff Correspondent, Louisiana-Arkansas.

SHREVEPORT, La., Feb. 20.—The Palmer Corp.'s No. 1 Robertson in the NW NE Section 26-23-12, in about the center of the east side of the Cartersville gas field in northern Bossier Parish, closed the week with a flow at the rate of 6,000 bbls. of fluid, 10 per cent water, from a total depth of 3,068 feet with the bottom in 2 feet of sand. It flowed at that rate for four or five hours but sanded up. Gas wells were in the majority in the week's completions, there being 10 of them with a total initial open flow capacity of 144,000,000 feet; three producers with a total production of 100 bbls., and six failures.

In addition to Moody & Seagraves' No. 1-C Hemler, Section 29-16-6, which was closed in as a 56,277,000-foot gasser at 2,503 feet after it had come in while fittings were being adjusted prior to drilling in and blew wild for a couple of days, Richland furnished another big gasser in the same company's No. 1 LaFleur, Section 18-16-6, estimated at 54,000,000 feet from a total depth of 2,470 feet. While neither is an extension well, the Hemler completion is at a lower level than other wells in this, the center of the most active area at present and affords more data as to probable thickness of the sand, indicating a thickness here of approximately 50 feet.

Natural Gas & Fuel Corp.'s crater well, No. 1-A Thompson, Section 21-16-6, is still blowing but no longer burning. It is noticed that the volume and pressure of the gas is much less than when it first blew wild leading to fears that it may be killing itself which is not causing any enthusiasm on the part of those engaged in killing it by flooding from offset relief wells. They argue that if the well should bridge it would create a back pressure making it considerably more difficult to force water into the cone at the bottom of the well than it will be with the well blowing. Richland wells average an initial rock pressure of 1,125 to 1,200 pounds which the pumps will have to buck before they can get water into the sand but with the crater well blowing this pressure is considerably reduced in its immediate vicinity.

Pine Island Operations

Developments in Pine Island, Caddo Parish, were about evenly balanced. Arkansas Natural Gas Co. abandoned attempts to recover the drill stem, stuck at 3,675 feet, in No. 1 C. W. Lane, Section 13-21-15, on the east edge of the Trinity development area and the test is dropped from the reports as a junked hole, total depth 4,101 feet. The Texas Company abandoned plans for drilling No. 7 A. Herndon, Section 14-21-15, on which it has had derrick up but not rigged since September. Dixie Oil Co. did not complete No. 4 Huckaby, Section 11-21-15, a possible extension of the 3,800-foot pay to the north, as reported last week, but after pumping at the rate of 80 bbls. from 3,890 feet for a few hours decided to go a little deeper and is drilling at 3,903 feet. With 5⅞-inch casing cemented at 4,004 feet to test 7 feet of sand at 4,010-17 feet, Pittsburgh Oil & Development Co. may have an extension of the deep stuff to the west with No. 1 Herndon, Section 15-21-15, which was formerly abandoned as a dry hole at 3,948 feet.

Sabine Parish had a small well in the Pleasant Hill district, Seip and others completing No. 1 Moore, Section 33-10-12, flowing 20 bbls. by heads, total depth 3,290 feet. Dixie Oil Co.'s No. 1 Steinfelt in Section 20-10-12, 2 miles northwest of production, was abandoned at 3,284 feet as a dry hole after a faint show of oil.

Champagnolle

Champagnolle developments turned away from the encouraging symptoms shown during the last two weeks or so. Oilwell Corp.'s No. 1 Dumas in Section 11-17-14, which was reported a completion last week with 10,000,000 feet of gas and 15 bbls. oil at 3,069 feet made more gas and oil as it was allowed to blow and after lubricating was drilling at 3,099 feet at last report. Magna Production Co.'s No. 1 Rowland, Section 14-17-14, made a drill stem test at 2,299 feet which filled 13 fourbles of drill stem with mud and the bottom fourble with oil, whereupon 6⅝-inch casing was cemented at 2,992 feet for a test. If a producer results it will be the shallowest in the 3,000-foot sand by several feet but this is thought due to surface elevation being somewhat below that of other Champagnolle wells rather than to location being higher on structure. Magna and Oilwell Corp. also made a test on their No. 1 Townsend, Section 10-17-14, which was dry at 2,829 feet and after coring a salt water sand below, it is temporarily abandoned at 3,047 feet. A test at 2,746 feet developed about 5,000,000 feet of gas and 200 bbls. salt water from 6 feet of sand. Simmerall and others' No. 1 Finley, Section 12-17-14, 2 miles east and south of production, was dry on a drill stem test at 2,710 feet and is drilling deeper. This is a critical test for Champagnolle in the opinion of many, as it will prove or disprove the theory that the best part of the structure producing what oil has been obtained in the pool is southeast of present development. The log has shown satisfactory conditions so far and this test in the upper sand whence the southwest extension well is producing does not necessarily mean that the 3,000-foot sand will be barren. Eddie Jones' No. 3 Crain in Section 2-17-14, shut down for several days at 3,670 feet, has resumed operations and the last report on it was that it had cored a sandy shale at 3,826 feet.

The Bellevue shallow pool of Bossier Parish had a salt water hole in Louisiana Oil Refining Corp.'s No. 32-D Bodcaw, Section 15-19-11, abandoned at 435 feet. The well was being drilled for fuel for the company's field operations.

Ouachita Parish added two small gas wells to the Monroe list, J. M. Huber's No. 4 Edwards, Section 1-18-4, being a 6,000,000-foot well at 2,211 feet and Southern Carbon Co. completing No. 3 Phillips, Section 8-19-4, with 10,000,000 feet, total depth 2,170 feet.

Gas Wells on Texas Side

Panola and Harrison County, Texas, accounted for 6 of the 10 gas wells completed during the week, three in each of the two districts. In Harrison County, A. M. Lide and others completed No. 1 Abercrombie in the R. W. Bedford Survey at 1,898 feet, making 3,500,000 feet of gas; C. H. Lyons and others' No. 2 Furrh, James Short Survey, made 2,500,000 feet of gas at 956 feet and Tylong Oil & Gas Co.'s No. 3 Vaughn in the W. R. Anderson Survey made 4,000,000 feet, total depth 959 feet. The Panola completions were S. H. Gardner and others' No. 3 Roquemore in the B. C. Jordan Survey, 2,500,000 feet of gas, total depth 2,285 feet; Magnolia Petroleum Co.'s No. 2 Sol Oden, E. F. Mitchell Survey, 1,210,000 feet of gas at 960 pounds, total depth 2,348 feet, and The Texas Company's No. 7-B Adams, Isom Hatcher Survey, 4,000,000 feet of gas at 370 pounds, total depth 1,002 feet.

The 100 bbls. new production obtained during the week came from Seip and others' well in Sabine; J. H. Askew's No. 3 Richardson, Section 25-13-11, Red River Parish, and J. J. O'Brien's No. 5-A Robert Haynie, Section 6-14-20, Nevada County, Arkansas. The former made 30 bbls. initial, pumping, from 2,551 feet and the latter is pumping 50 bbls. from 1,204 feet.

Production Decline Slackens

While the decline in daily average runs from the field, resumed last week after a brief reversal to a small increase the week before, was continued during the week just closed, the difference, 620 bbls., was only about half as great as during the week ending February 11. Runs totaled 133,575 bbls. against 134,195 bbls. the week before. Daily average runs from the pools were:

Louisiana	
Caddo light	11,570
Caddo heavy	3,945
Homer	4,440
Haynesville	6,400
DeSoto-Red River	4,295
Elm Grove	560
Bellevue	975
Cotton Valley	4,520
Urania	7,950
Pleasant Hill	680
Total	45,335
Arkansas	
El Dorado	5,150
Smackover light	8,540
Smackover heavy	67,965
Stephens	1,075
Nevada County	1,810
Lisbon	2,340
Champagnolle	1,260
Bradley	100
Total	88,240
Both states	133,575

LOUISIANA-ARKANSAS WILDCATTERS BUSY. TIDAL ENTERS MISSISSIPPI

By D. H. Bancroft

SHREVEPORT, La., Feb. 20.—Announcement of completion of two new blocks of wildcat acreage in Catahoula Parish with plans for immediate drilling; reorganization of the interests engaged in prospecting in Sabine Parish in the vicinity of Zwolle for the past three years with plans to continue the exploration now under way; and another rank wildcat in the far southeastern part of Union County, Arkansas were the principal developments in news of wildcat activities in North Louisiana and Arkansas during the past week. Mississippi has proved attractive to another major company and announcement was made during the week of preliminary work being done in that State by Tidal Oil Co., which has obtained a Mississippi charter under which to conduct its activities in that State.

The Texas Company has blocked 3,500 acres in Township 10, Range 6, Catahoula Parish and has made location for No. 1 Tensas Delta Land Co. in Section 4-10-6, 6 miles north of the Lochnager Oil & Gas Co.'s three tests, and about 8 miles south of the Pittsburgh Oil & Development Co.'s gas blowout several months ago. One of the Lochnager tests performed sensationally for a few hours before bridging, blowing about 15,000,000 feet of gas and 10,000 bbls. of salt water and enough oil to color the water, but bridged and was junked in trying to cut off the water. The second and third tests were failures and a fourth is drilling.

Leonard Petroleum Co., a Washington, Pa., concern with C. A. Ralph, president, has blocked 10,000 acres in and around Township 11, Range 8, and is rigging up in the C SW SE, Section 32-11-8, for No. 1 Knott, which it plans to drill to 3,500 feet if necessary.

Two Interesting Tests

Ten feet of sand at 2,093-3,003 feet in Edwin J. Forrest's No. 1 Perritt, Section 31-23-11, Bienville Parish, showed salt water with no oil or gas on a drill stem test and the wildcat, 8 miles south of Arcadia, is shut down waiting orders. Both of Winn Parish's wildcats, Ohio Oil Co.'s No. 2 Rolen Acct. 1, Section 5-12-1w, and H. M. Roark and others' No. 3 Southern Minerals Co., Section 19-11-3w, were of interest. The former made a barren drill stem test at 4,454 feet and is drilling, while the latter has developed into more or less of a "mystery."

Location is on a salt dome 3 miles west of Winnfield, the salt overlaid by the only outcrop of limestone so far found in Louisiana. The top of the salt was found at 490 feet, considerably lower than in Nos. 1 and 2, same lease and section, on the east side of the Southern Minerals Co.'s quarry, and after drilling into it for 35 feet was reported abandoned. A couple of weeks later it resumed drilling and passed out of the salt into rotten lime and sandy shale just below the level at which it had stopped drilling. At 580 feet it went into salt again, drilled through 8 feet of it and the next report it was in shale and boulders at 645 feet. Six and five-eighths-inch casing was cemented at 935 feet and this week the plug was drilled but the hole was not bailed. Instead the rig was suddenly shut down and the driller sent off

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NORTH LOUISIANA
Bossier Parish

Cartersville—Atlantic Oil Producing Co. No. 1 Bain, Section 31-23-11, is drilling at 2,465 feet. Bahan & Davis have cemented 6-inch casing at 3,069 feet with the top of the sand at 3,072 feet, total depth 3,074 feet. Magnolia Petroleum Co.'s No. 1 Cason, Section 1-22-12, has second string of 10¾-inch casing cemented at 805 feet. Palmer Corp. cemented 6⅝-inch second string at 3,065 feet on No. 1 G. W. Roberson, Section 26-23-12 Sales and Walker's No. 1 Kilgore, Section 31-23-11, is shut down at 2,815 feet for repairs to rig. The Texas Company is drilling plug with 6½-inch casing cemented at 3,063 feet on No. 1 Peyton, Section 30-23-11, and No. 2 Wilkerson, Section 36-23-12, cemented 6¼-inch casing at 3,072 feet. Woodley & Collins' No. 1 Bain, Section 31-23-12, is drilling at 2,400 feet; No. 1 Bolinger, Section 36-23-12, is drilling at 2,700 feet and No. 3 L. & A., Section 15-23-12, remains temporarily abandoned at 3,250 feet.

Bellevue—Humble Oil & Refining Co.'s No. 30 Bliss & Wetherbee, Section 15-19-11, the only drilling well in Bellevue since Louisiana Oil Refining Corp. got salt water in a proposed gas well, is in hard shale at 5,117 feet.

Elm Grove and Sligo—Clifton Davis' No. 1-A Simpson, Section 14-16-12, is drilling at 2,200 feet. Ellis & Markley are down 1,025 feet with No. 5 Hunter, Section 14-16-12. H. S. Goodwin cemented 4½-inch casing at 1,750 feet on No. 1 Mercer, Section 21-16-12. J. S. McCulloush began drilling No. 6 Hodges, Section 25-16-12, Feb. 8, cemented 10-inch surface casing at 105 feet and is drilling [illegible] shallow gas rock at 700 feet—rather high. Palmer Corp. has gone back to No. 10 Caplis, Section 25-16-12, completed

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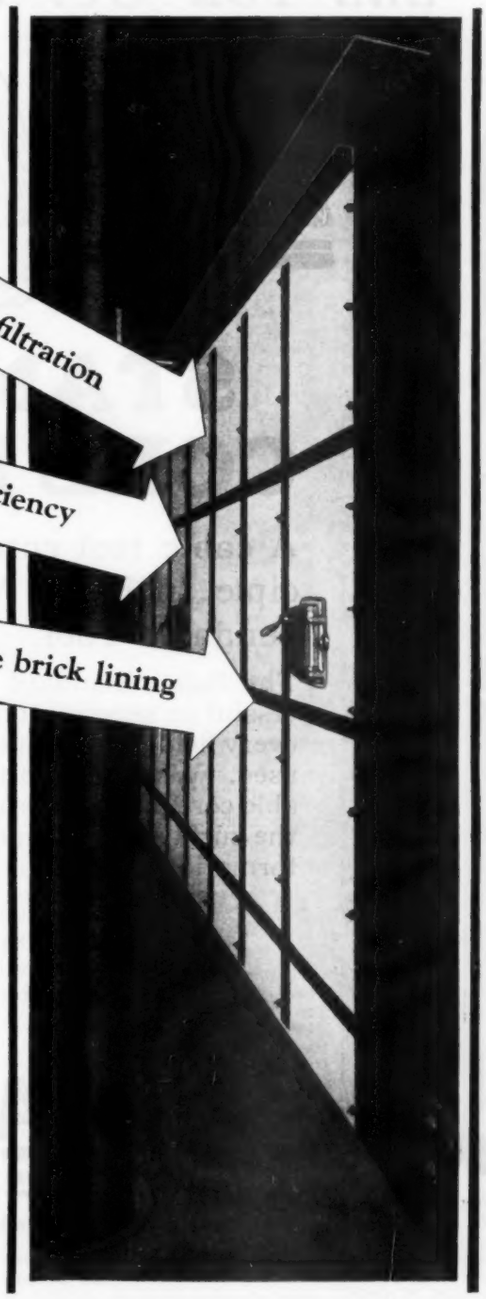
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New Gas Pool Opened in Laredo Area

Houston Oil Co. Gets Gasser 5 Miles South of Cole Gas Field. Operators Feel There Are Oil Possibilities

By B. D. Stevenson
Staff Correspondent, Southwest Texas

SAN ANTONIO, Tex., Feb. 20.—Cole Petroleum Co.'s No. 51 Benavides in Survey 412, Webb County, completed at 2,325 feet and reported recently as a 10,000,000-foot gas well spraying oil, has been turned into storage and the gas separated. The first 24 hours Thursday, February 9, it made 50 bbls. of oil Last week it was gauging 115 bbls. of oil in 24 hours with the oil flow still increasing. It is 21 gravity oil. This area is 8 miles east and a little north of the Schott Pool, the nearest oil in any quantity, and is 4 miles west of the Cole gas field in Duval County where there is also a little oil.

The Cole Petroleum Co. has been drilling in this territory for a year or more and got some good gas wells and a little oil before. The No. 46 Benavides near No. 51 is making about 20 bbls. of oil from approximately the same depth. No. 51 is the best-looking proposition thus far for an oil well and the next drilling by the company is likely to be a little north and west on the theory that the Nos. 51 and 46 are on the edge of the production. All of the Mirando pools are for the most part narrow affairs. Cole Petroleum Co. has No. 52 Benavides now drilling at about 2,000 feet and No. 53 at below 700 feet. No. 53 is a northwest offset to No. 51 and No. 52 is an east offset to No. 51. All three of these wells are about a half mile north of where the company picked up the first indications of production in this area a year ago.

Another feature of the Laredo territory the past week was the completion of the Houston Oil Co.'s No. 3-A Bruni, 1½ miles south of the Bruni station on the Texas Mexico Railroad. It is on a Roxana lease in Block 47, Survey 11, and in sand at 2,344-53 feet with casing set at 2,330 feet, is a 40,000,000-foot gas well with 770 pounds rock pressure. This well is 5 miles south of the Cole Petroleum Co. wells mentioned above and with some other gas wells in between at the same depth. Killam first found big gas at this depth in a well within less than a half mile of Bruni and about a mile north of the Houston well on Roxana lease. The Houston Oil Co. completed another well recently half way between this well and the Cole Petroleum Co.'s wells at about the same depth and thus there is a big new proven gas area opened up with a lot of oil possibilities along with it. The wells being about the same depth, however, does not necessarily indicate they are in the same sand.

Important Completion

Another completion of importance the past week is the Driscoll Oil Co.'s No. 10-A fee in Duval County in Survey 448, half way between the Cole gas field on the southwest and the Piedras Pintas salt dome on the northeast. It is a 30,000,000-foot gas well with a little indication of oil at a depth of 2,477-80 feet, with casing set at 2,477 feet and with rock pressure of 900 pounds. No. 8, which was the discovery well, got the sand at 2,448-69 feet. No. 10-A is about 1,800 feet west and north of No. 8. No. 8 was reported at 25,000,000 feet of gas in sand at 2,437-39 feet with casing set at 2,433 feet and had 900 pounds rock pressure. No. 7, located 400 feet south of No. 8, was the first to find the sand but was drilling with a light rig and the hole was lost. It got the sand at 2,448-69 feet. It was estimated at 25,000,000 feet of gas. It was first reported as the No. 5 fee. No. 9 Driscoll, located about a quarter of a mile east and a little north of the No. 8, picked up the gas at the same depth and late last week was down 2,961 feet and trying to take a core. It has passed through several sands but found them either dry or carrying water, except that some of them had a trace of oil

In the Kingsville Field in Kleberg County, No. 2 Flato of the Humble Oil & Refining Co. has gone dead. It pumped 15 bbls. a day for two years and sanded up late in December. Humble pulled about 250 feet of liner to clean the well and it came in a gusher with 250 feet of open hole and exposing two or three other sands above the 2,928-foot sand from which it had been pumping. It flowed more than 1,000 bbls. of oil and the same amount of water and after a month and a half has gone dead. It has probably sanded up. Humble has a northeast offset drilling below 2,500 feet and has gone back to No. 3 Flato, a quarter of a mile east, and has mudded it off. No. 3 blew in a gasser at 2,242 feet a year ago and ran wild and with about 1,000 feet of open hole was never completed.

A new deep test is to be started in the Carolina-Texas Field in Webb County by the Houston Oil Co. The well is No. 3 S. Benavides in Survey 683, and was a producing gas well at 3,014 feet. Recently gas wells in that sand began giving trouble due to reduced pressure and when the Associated Oil Co. opened two wells to the east of Houston's No 3 S. Benavides, one of them started off making oil and the other had 600 feet of oil in the hole. Houston has rigged up on No. 3 S. Benavides but has not started to drill. There is a sand at around 4,000 feet in the Carolina-Texas Field that has never been fully tested and which it is believed has possibilities.

Cole Gas Field—Duval

Houston Oil Co.'s (Roxana) No. A-3 Benavides, Survey 11, Block 41, located 314 feet to northeast line and 200 feet to northwest line, is testing at 2,330 feet. Houston Oil Co.'s (Humble) No. 2 Juan V. Cuellar, Share 1, Cuellar grant, at 474 feet to west line and 2,258 feet to north line, has derrick up. Houston Oil Co.'s (Sun) No. 4-B Benavides, Survey 12, Block 13, located 660 feet to north and east lines, is rigging up.

Humble-Reiter-Foster Field

Humble Oil & Refining Co.'s No. 7 Kohler, Survey 165, located 200 feet to north and west lines, has set casing at 2,793 feet with sand at 2,793-2,807 feet.

Piedras Pintas Dome

Humble Oil & Refining Co.'s No. 7 Walsh, Survey 185, located 2,505 feet to east line and 1,750 feet to north line, tested salt water at 4,484-4,505 feet and has been abandoned.

Randado Field—Jim Hogg

Johnson and others' No. 24 Palacious, Survey 291, Block 14, located 150 feet to east line and 726 feet to north line, is location.

Henne, Winch & Fariss Field

Edwards St. Albans' No. 9 Lopez, Share 1, Block 6, located 291 feet to east line and 180 feet to south line, is standing at 2,144 feet.

Reiser Field—Webb

W. O. Wheatley's No. 3 Wheatley, Survey 1,618, Block 12, located 850 feet to south line and 450 feet to west line, is drilling at 126 feet, having spudded in February 4

Alworth Field

Alworth-Stevens-Hild's No. 11 M. Garza, Survey 39, Block 10, is location.

Leaseholders Field

J. H. Winch's No. 1 A. E. Gates, Survey 70, located 1,470 feet to south line and 1,170 feet to west line, is drilling at 2,010 feet, where it cored lignite.

Aviator or Bruni Tracts

Livingston and others' No. 1 Puig, Block 5, Edgington Subdivision, 150 feet to north and west lines, is drilling at 1,400 feet.

Carolina-Texas Field

Houston Oil Co.'s No. 3 S. Benavides, Survey 683, located 350 feet to north line and 1,470 feet to east line, is rigged up at 3,014 feet to deepen and is waiting on orders.

Cole Gas Field No. 2

Cole Petroleum Co.'s No. 52 Benavides, Survey 412, Block 5, located 123 feet to north line and 482 feet to west line, is drilling at 1,950 feet; No. 53 Benavides, Survey 412, Block 3, located 160 feet to south and east lines, is drilling at 500 feet.

Driscoll Gas Field—Duval

Robert Driscoll's No. 9 fee, Survey 23, located 1,875 feet to west line and 2,850 feet to south line, tested dry at 2,941-44 feet and is trying to take a core at 2,961 feet; No 10-A fee, Survey 448, located 1,070 feet to east line and 2,758 feet to north line, is testing at 2,477-80 feet and is completed with 30,000,000 feet of gas and rock pressure of 900 pounds.

Magnolia Petroleum Co.'s No. 11 W. J. Tiller, John Henry Survey, 300 feet southwest of No. 5, is drilling at 2,122 feet. Pat M. Armstrong's No. 1 Hardeman, Miles G. Dykes Survey, is located 150 feet to northwest and southwest lines, is drilling at 1,850 feet.

Kingsville Field—Kleberg

Humble Oil & Refining Co.'s No. 3-B Dennett, Lot 19, Section 38, located 150 feet east of center of west line, has spudded in. No. 5 Kleberg, Block 8, Section 40, 150 feet to west and south lines, is drilling at 2,050 feet; No. 6 Kleberg, Lot 1, Section 40, located 150 feet to east line and 450 feet to north line, is drilling at 1,150 feet. Houston Oil Co.'s No 2-A Kissman, Section 41, Block 10, is located 500 feet to north and west lines, is standing; has derrick up.

Dale Field

The Texas Company's No. 1 Jeff Moore, J. Gilbert Survey, total depth 2,153 feet, top of Serpentine at 2,024 feet with 5 feet of oil in the hole.

Medina County

C. E. Lange and Jake Jarmon's No. 1 Adams, F. Mumme Survey No. 71, is located 500 feet to north and west lines of Block 20, Mrs. M. M. Adams Subdivision. Shut down at 60 feet since last November, but is preparing to resume.

Saxet Field—Nueces County

Alamo Drilling Co.'s No. 1 Gallagher, 10 miles southwest of Corpus Christi, is shut down at 150 feet.

Refugio County

Houston Oil Co.'s No. 1 Rooke is drilling at 2,850 feet. No. 6 Rooke is drilling at 3,000 feet. No. 4 Rooke cored sand at 2,634 feet; No. 8 J. W. Heard is drilling in gumbo at 3,216 feet; No. 1 Smith Heard is rigging up to deepen to 3,300-foot sand. No. 11 W. J. J. Heard set casing at approximately 3,000 feet. Houston Oil Co.'s No. 2-A Rooke is drilling at 2,600 feet. Houston Gulf Gas Co.'s No 2 Shelly at 3,307 feet is waiting on casing. No. 5 W. Heard is drilling at 830 feet. No. 2 Ryals is drilling

(Continued on Page 125)

HUMBLE WILL TEST DEEPER SAND ON WESTERN EDGE DUVAL COUNTY

By B. D. Stevenson

SAN ANTONIO, Tex., Feb. 20.—Humble Oil & Refining Co.'s No. 7 Kohler in the western edge of Duval County, 10 miles north of the Cole gas field has passed the sand that has been making about 50 bbls. daily in each of No. 4 and No. 6 Kohler but has found a sand at 2,793-2,807 feet, about 100 feet deeper, and has set casing and will test. No. 7 is in the northwest corner of Survey 165 and No. 6 Kohler is in the southwest corner of Survey 400. No. 7 offsets No. 6 on the south. Humble's No. 2 Kohler about three-quarters of a mile west of No. 6 is a dry hole and otherwise the field is not outlined. Reiter-Foster own a one-fourth interest in the proposition.

After several weeks delay Alworth-Stevens-Hild in Survey 39 in the western edge of Jim Hogg County, 5 miles south of the Randado Pool, are preparing to start their No. 11 Garza. No. 10 Garza came in making 10,000,000 feet of gas and enough oil to make it a good commercial well at about 1,000 feet. Early drilling by the company in this area got considerable gas and evidences of oil farther north but not proving up a very satisfactory field. No. 10 was drilled to the south and it is believed to be an edge well. Now No. 11 is to be started still farther south and on its outcome the future of the field pretty well depends.

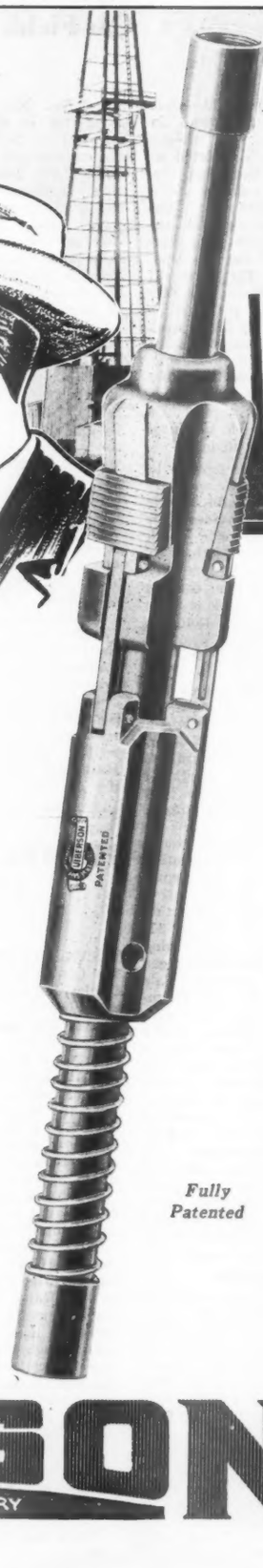
Little Drilling

With only 30 operations in the Laredo district listed the past week drilling is the slackest it has been in years. Every well listed is a wildcat or else is being drilled to prove up territory where some new production has recently been found with the exception of two wells in the Randado Pool. In the old Reiser Field, W. O. Wheatley at 334 feet has topped a sand that looks as though it might have something in it, and is setting casing to make a test in Block 12 of Survey 1,618. It is now several years since gas was used from the Reiser Field.

In Dimmit County, Humble Oil & Refining Co. is abandoning No. 1 City National Bank in Survey 654 at 5,004 feet where it tested dry and in abandoning it shot the casing at 2,900 feet where it tested dry again. Then at 1,455-85 feet the casing was shot again and when bailed came in for 2,000,000 to 3,000,000 feet of gas and about 500 bbls. of salt water a day. As much of the casing as possible is being pulled and the well mudded off and will probably be abandoned. It is 20 miles or more southeast from the Rycade's No. 1 Chittim in Maverick County that at 5,640 feet made 28,000,000 feet of gas and sprayed 75 bbls. of oil.

Mrs. McMurtray's No. 1 Durab in southern Bastrop County, 2 miles west of Red Rock had 10 feet of Serpentine from 2,299 to 2,309 feet and below that a hard lime probably the base of the Taylor marl or top of the chalk and was last drilling at 2,359 feet. There was no oil in the Serpentine but with the Lytton Springs and Dale fields in mind and the knowledge that this part of the Balcones Fault zone has Serpentine plugs, this location of 10 feet of Serpentine is interesting and important since it may lead to the discovery of a new Serpentine plug. If some of the wells afterward drilled in Lytton Springs and Dale had been drilled first those fields might still be undiscovered for dry spots are found

(Continued on Page 125)



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Sweet Lake Well Flows 2,400 Barrels

Cameron Parish Well and Gulf Co. Well at Sorrento Dome Were Features of Week on Gulf Coast

By Neil Williams
Staff Correspondent, Gulf Coast Fields

HOUSTON, Tex., Feb. 20.—Although opening of Gulf Refining Co.'s new wildcat producer at Sorrento Dome, Ascension Parish, Louisiana, and the bringing in of the fourth and largest well at Sweet Lake, Cameron Parish, Louisiana, featured Gulf Coast field developments the past week, daily average production fell off 8,937 bbls. to a low mark for the past year of 112,864 bbls.

Production, however, is expected to reflect a substantial increase the coming week, especially if the two new wildcat wells hold up. The flow of neither is included in the past week figures, neither having made more than a day's flow by the close of the week.

Gulf Refining Co. opened its No. 4 United Land Co., Section 15-10s-4e, on the Sorrento Dome late Thursday for a test run, flowing into an earthen pit. It first made considerable water and sediment but after some experimenting with various chokes, the well Saturday was producing at the rate of 6,000 bbls. of fluid daily, 4 per cent sediment and water, through 1¾-inch choke.

The opening of this well definitely assures another major field for South Louisiana and the first pool east of the Mississippi River. As the well had been permitted to flow only a few minutes since it was completed several weeks ago there had been considerable uncertainty of what it would make and of the importance of the Sorrento Dome.

This well originally was brought in making an estimated 15,000,000 feet of gas but was shut in immediately for a gauge. When opened several days later for that purpose it started making oil and in 11 minutes flowed at the rate of an estimated 4,000 bbls. It then was shut in for a week and when opened a few minutes it made "lots" of gas with only a heavy spray of oil. Since then it has been closed pending erection of storage.

The well is the fourth test drilling on that dome but is the first successful completion. It is in the center of a 45,000-acre block held entirely by the Gulf Refining Co. of Louisiana and for this reason it is causing no particular stir among coastal operators other than to stimulate prospecting east of the river. Production of the well is from sand at 1,660 feet, the oil testing approximately 26 gravity.

Good Well at Sweet Lake

The Sweet Lake Field of Cameron Parish, Louisiana, another one-company pool, got its fourth and largest well when Pure Oil Co. brought in its No. 4 Sweet Lake Friday night flowing 100 bbls. of pipe line oil hourly through the 4-inch casing or at the rate of 2,400 bbls. daily. The completion of this well follows that of No. 5 Sweet Lake two weeks ago flowing 1,500 bbls. daily through a quarter-inch choke.

Production in the two wells, however, is from different sands, the No. 5 being from the deep sand at 5,924 feet while that in No. 5 is from sand at 5,562-5,660 feet. Sweet Lake wells so far have been marked by sharp declines in production, and the No. 5, which came in two weeks ago flowing 1,500 bbls. daily, averaged only 175 bbls. daily the past week.

The decline in production the past week was due to a coincidence in that a half dozen of the Gulf Coast's best wells in scattering fields, either went dead or fell off to a small output. The Texas Company lost two good wells at West Columbia; Moody corporation lost one at Pierce Junction; Rycade Oil Corp.'s output at Nash Dome fell off over 1,000 bbls. daily while at Spindletop several companies lost wells.

Spindletop's output fell off to a daily average of 37,506 bbls., a new low mark since the south and southwest flank deep sand production was opened the latter part of 1925. Virtually all pools showed some decline.

Daily Average Production

Daily average production of Southwest Texas pools again continued almost steady but that in Central Texas fell off 445 bbls. Daily average production by districts and fields for the week ending February 18 was:

Gulf Coast	
Spindletop	37,506
Saratoga	1,012
Batson	1,355
Goose Creek	7,264
Sour Lake	3,397
Hull	11,586
Big Creek	1,922
Columbia	7,448
Humble	3,185
Pierce Junction	8,077
Blue Ridge	4,375
Markham	200
Orange	4,344
Damon Mound	825
Dayton	241
South Liberty	1,872
High Island	379
Moores Field	148
Boling	1,939
Nash Dome	1,878
Barbers Hill	650
Vinton	4,356
Starks	270
Edgerly	1,366
Evangeline	959
Lockport	4,835
Sweet Lake	175
Sulphur	248
Hackberry	1,052
Total this week	112,864
Total last week	121,801
Decrease	8,937
Southwest Texas	
Somerset	2,173
Lytton Springs	1,530
Dale	854
Luling	14,195
Miscellaneous	7,925
Total this week	26,677
Total last week	26,677
Difference	0
Central Texas	
Mexia	7,857
Cedar Creek	880
Nigger Creek	955
Currie	508
Wortham	2,075
Richland	575
Powell	12,412
Total this week	25,262
Total last week	25,707
Decrease	445

East Hackberry Dome

As the week closed particular attention was being paid to the East Hackberry district of Cameron Parish, Louisiana, where the Calcasieu Oil Co. was testing its No. 1 Watkins. This test, which is 200 feet north of the discovery well brought in last November 5, ran considerably higher and a much better producer is expected out of it than the two previous wells, No. 2 Caldwell and the No. 1 Olevia. The oil sand in this test was topped at 3,946 feet and 6⅝-inch casing is set at 3,945 feet.

Calcasieu Oil Co.'s No. 2 Watkins at East Hackberry is drilling sand and rock at 2,152 feet, while its No. 1 Dorion is down 3,258 feet. Yount Lee Oil Co. also is drilling in its East Hackberry test.

A delay in testing a sand encountered on the old Hackberry Dome, about 2 miles west, in C. O. Noble and associates' No. 1 Ellender has been occasioned by the bit twisting off, necessitating a fishing job. This is the test which almost blew out showing heavily of gas and oil and which operators figured might become the discovery producer of the Old Hackberry Dome, which has been drilled around unsuccessfully since 1903. The Noble test was being reamed down in order that casing might be set when the bit twisted off.

Brenham Dome

Considerable activity has been started on the Brenham Dome in northern Austin County, where five new tests were started the past week. The Brenham Dome itself lies mostly in Washington County, but the present drilling is on the south flank on the Austin County side. The new tests will be Conklin and associates' No. 5 Pomacal, S. M. Williams Survey, 300 feet east of No. 3; Pratt and associates' No. 3 Koniecsky, S. M. Williams Survey, 200 feet northwest of No. 1; Thompson and associates' No. 9 Pomacal, S. M. Williams Survey, 50 feet from the north line of the 20-acre tract and 50 feet west from the creek; on the same operators' No. 10 Pomacal, 50 feet west from the creek and midway between Aronson and associates' Nos. 2 and 3; same operators' No. 11 Pomacal, 50 feet from the north line of the 29-acre tract.

There have been no tests drilling at Brenham for several months, the present activity probably being stimulated by the recent completion of a good well by the Humble Oil & Refining Co. at Raccoon Bend, several miles southeast in the same county. At Raccoon Bend, Humble has two tests under way, No. 1 Wilson being down 1,886 feet in shale and lime and No. A-1 Grawunder spudding.

Roxana Petroleum Corp. has completed its No. 1 Allen Bernard on the Allen Dome, Brazoria County, pumping 29 bbls. daily from deep sand at 5,337 feet. This is the well on which Roxana has been working for over a month in an effort to make it flow. No. 4 Allen also is expected to make a flowing well from a shallower sand at 4,913 feet. This well still was bailing Saturday, making 13 bbls. of oil in 10 hours. A third test, No. 1 Random, on the same dome, is fishing at 4,913 feet. The latter blew out several weeks ago and caved the hole. On the Clemens Dome, Roxana is drilling sandy shale and lime at 5,876 feet.

Miscellaneous Texas Wildcats

A rank wildcat now nearing the interesting stage is Pure Oil Co.'s No. 1 Lost River at Lost Lake, Chambers County. This test is drilling below 3,570 feet and, according to geophysical calculations, should be about on the expected producing level. This is the first test drilled at Lost Lake, which is held entirely by the Pure Oil Co., the latter company also having rigs up for five other tests, although these probably will not be drilled until the completion of the first test.

At DeWalt, Fort Bend County, Humble Oil & Refining Co.'s No. 1 Sugarland Industries is drilling gumbo at 2,645 feet. Humble hit cap rock in its latest test on the Hockley Dome, Harris County. This is No. 1 Tex-Ex.-Warren, which is 1 foot in the rock at 400 feet. The test probably will be abandoned. Humble's other Hockley test, No. 2 Warren, is drilling rock at 4,231 feet. Hockley is an old dome wildcatted on for the past 20 years without favorable results.

Alexander & Lyle's No. 1 Gobel, Austin County, has a fishing job at 2,580 feet, but Weadock and associates' No. 1 Ward, another Austin County wildcat, is drilling below 950 feet. Rucks and associates' No. 2 Muldoon, Brazoria County, is drilling around 1,200 feet, and Stanfield & Meyers' No. 1 McNeill, also in Brazoria County, is drilling blue shale around 500 feet.

In Colorado County, a sand showing considerable gas has been encountered by B. A. Johnson's No. 1 Breeding at 1,850 feet. A drill stem test was to have been made during the week, but this had not been done by the close of the week. Waldvogel and associates' drilled 210 feet of hole in their No. 1 Tanner, Colorado County, 3 miles south of Glidden, but the drill stem stuck.

Gulf Production Co. abandoned a wildcat at Long Point, Fort Bend County, in its No. 2-A Beard. This test was drilled to 4,801 feet, but because of heaving shale it was impossible to go deeper. Gulf has two other tests drilling at Long Point, No. 7 Wolf and No. 6 Trone.

Hunt and associates' No. 1 Adorie-Lobit, a Harris County wildcat, has been shut down again with the hole only down 880 feet. Juanita Oil Co.'s No. 1 Kitsman at Cypress, also in Harris County, still is being washed to the bottom at 1,175 feet.

In Jasper County, Oscar Head's No. 1 Boykin is drilling below 900 feet, but in the same county Tar Well Oil Co.'s No. 1 Nona Mills has been shut down after drilling to 561 feet.

Two wildcats still are drilling in Jefferson County, these being James McMurry and associates' No. 2 Crosby, down 2,700 feet, and Port Arthur Oil & Gas Co.'s No. 4 West at 3,550 feet. The former is 5 miles northeast of Port Arthur, and the latter at Westburry.

In Tyler County to the north of the Gulf Coast Counties, Union Sulphur Co.'s No. 1 Wynn Buchanan, 12 miles northeast of Woodville, is drilling around 1,800 feet. This company also is starting another test in Tyler County, No. 1 Crumpit, 14 miles east from Colmesneil.

Miscellaneous Louisiana Wildcats

Midway between the Lockport Field and Lake Charles, Newton Drilling Co.'s No. 1 Dupre still is drilling ahead and at latest reports was in sandy shale at 3,510 feet. It is somewhat deeper than at present, however.

Gulf Refining Co. abandoned two tests at Loreauville on the Feussa Point Dome, Iberia Parish. No. 1 Broussard, Section 26-11s-8e, tested salt water at a total depth of 5,026 feet, and No. Z-3 State, same section, drilled into salt at 1,393 feet, and is 1 foot in. Location, however, has been made for No. Z-4 State, 500 feet east of No. Z-3, 100 feet from the north line and 650 feet from the east line of the southeast quarter.

Louisiana Land & Exploration Co. has abandoned its No. 1-A Vermillion Bay, Section 20-15s-6e, Iberia Parish, after drilling to 941 feet in salt topped at 815 feet. This test on Vermillion Bay proved the existence of a new salt dome there.

At White Castle, Iberville Parish, Roxana Petroleum Corp. is coring sticky shale with streaks and patches of oil sand having an odor of sulphur and cap rock oil. This test is down 1,746 feet.

In St. Martin's Parish, Rycade Oil Corp.'s No. 2 Atchafalaya fee, Section 13-9-s-8e, is coring at 2,692 feet.

Operations in Gulf Coast fields are:

Spindletop—Jefferson County

Gulf Production Co. and Sun Oil Co. each brought in a good well the past week at Spindletop. Gulf's well, No. 18-A Marrs McLean, came in flowing 1,800 bbls. of pipe-line oil from sand at 5,110 feet. Sun Oil Co.'s well was No. 1 Coit, also an 1,800-bbl. producer from sand at 4,999 feet. Gulf Production Co.'s No. 7 Jack & Duff tested salt water when swabbed at 4,914 feet and is being deepened. This company's No. 10-A Marrs McLean was abandoned with drill stem stuck at 5,380 feet. Gulf's No. 8 Jack & Duff is flowing by air 100 bbls. daily from sand at 4,950 feet. No. 13 Oakwood is drilling at 2,650 feet and a derrick is up for No. 13-A Weed. The latter follows No. 12-A Weed, which was abandoned temporarily earlier in the month. Magnolia Petroleum Co. also abandoned

(Continued on Page 125)

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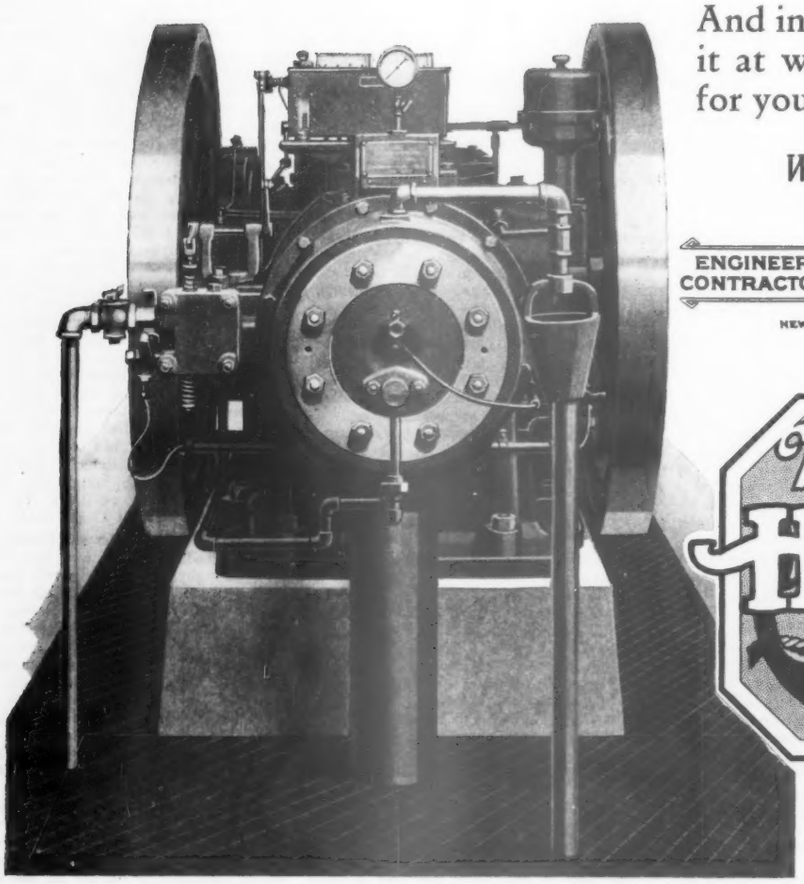

The HOPE 40

HE-52

Important Discovery in Wyoming

Well in Carbon County Gets 36 Gravity Oil Showing in Tensleep Sand. Extensive Drilling Campaign Planned in New Mexico

By Tolbert R. Ingram
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., Feb. 18. — Several important developments were reported during the past week in the Rocky Mountain area. The Marland Oil Co. announced a program for 10 wells this summer in southeastern New Mexico of which three locations have been made in Lea County and one is drilling in Eddy County. The three Lea County tests run from near the Texas Production Co.'s No. 1 Rhoades, north of the Winkler County, Texas, development, in a northwesterly direction, towards the Maljamar Pool in eastern Eddy County. This is expected to be a forerunner of a number of other locations by other companies to be announced soon. Two new locations were made in Eddy County, one west of the Artesia Pool by R. D. Compton, and another by Getty Oil, Inc., in the new pool it has opened 10 miles southeast of the Artesia operation.

In Utah the Midwest Exploration Co.'s Ashley Creek test is showing a little oil in the Morrison below the sand which made 29,000,000 feet of gas, and is drilling ahead with prospects in the Sundance very promising. The operation is 100 miles west of the Sundance sand producers in Colorado.

In Colorado, arrangements have been made to continue drilling the Northeastern Colorado Oil Co.'s test on the Willard Dome in Logan County, which is bottomed in the Lakota sand at 5,564 feet and showing a little gas, and the Parker Club's No. 1 Adams, in Las Animas County, near Branson, has suspended drilling at 3,873 feet. The Repollo Oil Co. is abandoning its Parallel Dome test in Boulder County, and two good completions, one for 245 bbls. and the other for 140 bbls. initially, were reported in the Florence Pool. Two new locations have been made in that area by the Continental Oil Co.

In Wyoming, the Producers & Refiners Corp. has made a discovery in the Tensleep sand in the Pennsylvanian on the East Ferris Dome in Carbon County, at 4,523 feet, which may prove one of the most important in years, as it is the first test to the Pennsylvanian in southern Wyoming. The oil is light green of 36 gravity compared with black oil in the Pennsylvanian in the northern area. The Ohil Oil Co.'s No. 1 Washakie, which added considerable proven area to the Grass Creek Field in Hot Springs County, has been completed with 100 bbls. initial production.

New Mexico

The most ambitious wildcatting campaign in southeastern New Mexico so far outlined for the present year is announced by the Marland Oil Co. It calls for 10 wells in Lea and Eddy Counties, of which one already is drilling and three are either locations or digging cellars. Marland has approximately 500,000 acres in that area, a considerable part of which was blocked up before the recent activities commenced. This acreage, while in large blocks, is scattered throughout the territory that recently has attracted so much attention and the tests are so located as to give a wide range of information as to the prospects for the developing of some good pools. Most of the wells will be drilled to a depth of around 4,000 feet, and some of them will have the Delaware sand as the objective and the others will test the lime.

The well that is drilling is No. 1 Eaves, SW cor. SE Section 19-26-37, in Lea County, 2 miles west of the Texas Production Co.'s No. 1 Rhoades. The Rhoades well is shut in at a total depth of 3,261 feet as a gasser, having tested 22,000 000 feet of gas and 120 barrels of oil. The Eaves well is drilling at 325 feet and had a hole full of water at 285 feet. The 20-inch casing was set at 185 feet. Another location is No. 1 U. S. Permit in the SW cor. Section 4-25-36, in Lea County, approximately 10 miles northwest of the Rhoades well. It is digging cellar and moving in. A third location is the Marland's No. 1 U. S. Permit in the SW cor. Section 20-23s-35e, for which cellar is being dug. This location is approximately 21 miles northwest of the Rhoades well and 10 miles north and 6 miles west of the location on Section 4. These three wells are so located as to yield valuable information concerning the trend of the folding upon which the Rhoades well is located and indicates that the Marland company concurs in the opinion that the Winkler County, Texas, folding trends in a northwesterly direction towards the Maljamar Pool on the boundary between Lea and Eddy Counties. The other Marland location is its No. 1 U. S. Permit in the NE cor. SW Section 34-23s-31e, in Eddy County, 15 miles southeast of No. 1 Workman, joint well of the Marland-Ohio Oil companies, which was abandoned at 3,260 feet, and 14 miles northeast of a test drilled by the Sun Oil Co. to 3 965 feet and which had a show of oil and gas at 3,262 feet.

More Locations Expected

The announcement of the Marland locations is considered a forerunner of others to be made in that area. The Midwest Refining Co., which already is drilling a test in Lea County near Hobbs, has a block just to the east of the Texas Production Co.'s block upon which the Rhoades well is located, and while its intentions have not yet been announced, it is expected that a test on this block will be drilled this summer. The Texas Production Co. has drilled six wells in southeastern New Mexico, which takes care of all its drilling obligations for the present, but it is probable one more well will be drilled on the block upon which the Rhoades well is located. The Roxana Petroleum Corp. is mentioned among those most likely to drill, while two rigs have been shipped to Carlsbad by another company that is not yet ready to announce its plans.

Lea County drilling operations show little out of the ordinary for the week. The Maljamar Oil & Gas Co.'s No. 2 Beardsley, SE NE Section 15-17-32, was delayed by a fishing job at 4,295 feet, but expects to be making new hole by this time. Henderson, Dexter & Blair's No. 1 Wyatt, SW SW Section 34-17-33, has been abandoned at a total depth of 5,370 feet, and Cecil Bordages' No. 1 Hughes, Section 27-19-38, is drilling in a wet hole at 1,450 feet. Midwest Refining Co.'s No. 1 State, Section 9-19-38, is rigging up to resume drilling.

In Eddy County, several new locations were announced. R. D. Compton and others have made a location for No. 1 Vandergriff, NE NW NE Section 8-18-27. Materials are being moved in. This is on the western side of the Artesia Pool. Getty Oil, Inc., No. 2 Dooley, 660 feet south of north line and 210 feet east of west line, NW Section 24-20s-29e, is moving in materials. Same company's No. 1 Nicholas, NW NW Section 25-20-29, is swabbing 30 barrels a day from a total depth of 1,384 feet. R. D. Compton's No. 4 Mann, SW NW Section 4-18-27, is plugging off water at 2,295 feet. Grimm & Ross' No. 1 Daugherty, NE SW Section 3-17-27, is drilling below 1,800 feet. Gates, Holman & Rehn's No. 1 Murdock, SW cor. NE Section 7-21-28, is drilling below 400 feet.

In Chaves County, the Arena Oil Co.'s No. 1 Wilkins, NE NW Section 18-13-31, which attracted some attention last week, when a flow of 1,000,000 feet of gas was reported, is drilling at 2,695 feet. The gas was in a red sand cut at 2,625-80 feet. It was at first thought the gas was coming from the same horizon in which gas was encountered in the Texas Production Co.'s Robinson wells 18 miles to the south, but the formations are not the same. Barrendo Oil & Gas Co.'s No. 1 Roswell Farms Co., SW cor. Section 5-10-27, is cementing pipe at 180 feet. The derrick over the Buffalo-Roswell Oil Co.'s test in Section 24-11-27, was blown down in a wind storm. The operation has been shut down for several weeks at 4,300 feet.

San Juan County

In San Juan County, in the northwestern part of the State, the recovery of lost tools and clearing of the hole in the Union Oil & Mining Co.'s No. 2 Pine, SE SW Section 8-29-9, in the Blanco District, was the most exciting event of the week. This well has been delayed at 2,940 feet for 17 months with fishing jobs, there being as many as five strings of tools in the hole at one time. When the first string was lost, the well was making a little oil and gas. All the casing was pulled and this has been rerun and cleaning out now is in progress. The rig was burned to the ground twice since well spudded. A. Johnson, Trustee's No. 1, Section 34-29-11, south of the San Juan River, encountered a flow of gas estimated at 1,000,000 feet, at 1,780 feet This is approximately the same depth at which the Senate-Congress-National well in the same section had some gas in the Picture Cliff formation. The 6⅝-inch casing is being run. The San Juan Petroleum Corp.'s No. 2 San Juan, Section 9-29-13, near Farmington, is showing a little gas and drilling at 2,775 feet. The 6⅝-inch casing was run at 2 685 feet. H. L. Hall and other's No. 1, Section 18-22-13, Stony Butte Structure, is drilling at 170 feet. The Continental Oil Co.'s No. 17 Santa Fe Corp., Section 2-29-9, Rattlesnake Dome, is drilling at 4,505 feet. The Huntington Park Oil Co.'s No. 1 Terwilliger, SE Section 29-30-9, is drilling at 4,332 feet in hard white sand in the middle member of the Mesa Verde. Co-Ne-Mo Oil Co.'s No. 1 SE SE Section 28-29-11, Kutz Canon District, is drilling at 100 feet. Poole & Peebles' No. 1 Lawson, SE SE Section 9-30-11, is drilling out cement at 600 feet.

In McKinley County, the Continental Oil Co.'s No. 1 Santa Fe, Section 9-17-7, Carica Dome, is drilling at 3,140 feet.

Utah

A show of oil in the Midwest Exploration Co.'s No. 3 Ashley Creek, Section 23-5s-25e, in Uinta County, northeastern Utah, in a sand believed to be one of the Morrison series, is considered one of the most important developments in that State for some time. The drill is working in the Morrison formation in which several sand strata showing gas have been cut. Last week the well was reported making 29,000,000 feet of gas from a sand at 1,662-87 feet. After going out of this sand, it cut a thin stratum at 1,732 feet showing a little water. Another sand was cut at 1,865-1,809 feet, still in the Morrison, which showed about 6 bbls. of oil through 600 feet of water from the horizon at 1,732 feet. At last reports the well was drilling at 1,811 feet, being 3 feet in a red shale. The intentions are to go a few feet deeper and set the 8¼-inch for a formation shutoff. The significance of the oil showing is that it appears to be coming up from the Sundance sand which lies just below the Morrison and that the grade of oil is about the same as that found in the Moffat County Sundance sand wells.

The Ashley Creek test is about 100 miles due west of the Iles Dome in Colorado, where Sundance sand production has been developed. The Midwest Exploration is drilling the well for the Utah Oil Refining Co. and affiliated interests. It is the third test put down, the first one developing a big flow of gas in the Morrison, but which was not continued to the Sundance, which at that time had not been proven in Colorado. The second well was on the same section but a little to the west of No. 1 and was abandoned in the Frontier at 700 feet when it was found to be down structure. The rig was then moved to the east of No. 1 where No. 3 is drilling. Conditions are so similar to those in the Iles and Moffat Domes operations that the prospects for opening a pool in that region are very encouraging. If such should result, it will give a great impetus to wildcatting on a number of structures on both sides of the boundary west of the Iles Dome.

Western Ventura Corp.'s No. 1 Krumvieda, SE Section 6-5s-21e, Vernal Monocline, in Uinta County, less than 10 miles northeast of the Ashley Creek wells, is drilling at 380 feet in a 12½-inch hole. This well, however, is a Tertiary test. Maud Ellen Oil Co.'s No. 1, SE Section 28-3s-21e, on the Neal Dome, is drilling again at 638 feet after being delayed by a fishing job. The 12½-inch will be set around 650 feet for a formation shutoff.

The Utah Southern Oil Co.'s No. 1-A J. L. Shaffer, Section 36-26 20, on the Cane Creek Dome in Grand County, is drilling at 226 feet in gray lime. This is a joint well with the Moab Consolidated Oil Co. Same interests expect to start a test on the flank of the Salt Valley Structure at an early date and H. W. C. Prommel is now in the field making the location. Utah Sounthern's No. 1 Canyon, Section 18-41-19, East Anticline in San Juan County, is drilling at 1,590 feet. It has just gone through 60 feet of broken lime which made progress slow. Embar Oil Co.'s No. 1 Big Six, Section 34-25-21, Moab Dome, is drilling at 5,260 feet in shale. The Texas Production Co.'s No. 1 Shipley, Section 5-27-14, Sweetwater Anticline in Wayne County, is fishing at 2,885 feet. Boulder Knoll Oil & Gas Co.'s No. 1, Section 17-34-25, near Monticello, is drilling at 2,300 feet in the red beds. The Mid-American Oil Co.'s No. 1, Section 17-43-15, Bloomington Dome in Washington County, is drilling at 1,185 feet in hard formation after setting casing. Midwest Exploration Co.'s No. 1 Early, Section 13-4s-6w, Duchesne County, is in brown shaley lime at 2,970 fet. The Continental Oil Co.'s No. 1 Boundary Butte, San Juan County, is drilling at 3,290 feet.

Colorado

A deal was made the past week whereby one of the important Colorado wildcats, the Northeastern Colorado Oil Co.'s No. 1 State, Section 36-8n-55, on the Willard Dome, in Logan County, far out from the mountain range and away from any other test, will be drilled deeper. This test is bottomed at 5,564 feet, about 14 feet in the Lakota sand, which was showing a little gas when drilling was suspended on account of the hole caving and the company being in no position to run another string of casing. The Continental Oil Co. has agreed to furnish 400 feet of 3½-inch liner and a string of 3-inch tools and other equipment in exchange for a lease on 160 acres adjoining the tract upon which the well is located; and the Argo Oil Co., which has been assisting in financing the well for

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several weeks, will continue its aid. The local company is obligated to protect leases which are about to expire. The Willard well already has furnished valuable geological data on the plains region, the most important of which is that it has shown a considerable thinning of the beds between the base of the Fox Hills and the top of the Dakota away from the mountains, the well being located approximately 100 miles east of the Wellington-Fort Collins Domes in Larimer County. While some water was found in the main Dakota sand, the absence of water and the show of a little gas in the Lakota holds out some hopes of bringing in a producer, but even should no such result be obtained, the information gained from drilling a little deeper is believed to be worth the additional cost.

In Las Animas County, in the southern part of the State, the Parker Club's No. 1 Adams, Section 32-34-56, near Branson, has suspended drilling at 3,873 feet. Future plans have not been announced. This well already has proven that the Pennsylvanian formation is in place in that area. The Phillips Petroleum Co.'s No. 1 Haskins, Section 23-29s-56, on the Red Rocks structure, joint with the Reiter-Foster Oil Co., is drilling at 1,118 feet.

In Huerfano County, the Kinney-Coastal Oil Co.'s No. 1 Pinos, Section 24-26s-68, on the Escondido Dome, joint with the Texas Production Co., is drilling at 933 feet after lowering the 10-inch casing to 915 feet.

In Boulder County, the Repollo Oil Co.'s No. 1 Nichols, Section 32-1n-70, is pulling casing preparatory to abandoning at a total depth of 6,145 feet. The Dakota sand topped at 6,135 feet showed water. It has not yet been decided whether the Essok Oil Co.'s No. 1 Martin, Section 5-1s-70, idle at 5,230 feet, will be drilled on down. This well logged 120 feet higher than the Nichols well. Negotiations are in progress between the Repollo and Essok companies. The Boulder Oil Co.'s No. 1 Hoover, 5 miles east of Boulder, is reported to have had a slight show of oil at around 1,100 feet.

Iles Dome

On the Iles Dome in Moffat County, the Midwest Refining Co.'s No. 34-SD Parkinson, SE SW Section 22-4-92, which averaged 72 barrels an hour initial production from the Sundance at 3,227-90, has been listed as a completion. It has been beaned down to a one-fourth inch choke through which it averaged 497 bbls. a day with a back pressure of 125 lbs., the first week. Same company's No. 8-SD Parkinson, NW NW Section 23-4n-92, was abandoned at a total depth of 1,759 feet, where it has been attempting to sidetrack a string of tools. The rig is being skidded and a new hole started. Same company's No. 7-SD Parkinson, NW NW Section 23-4-92, is held up below 2,200 feet with some parted casing, which telescoped, in the hole. Swedging the 12½-inch is now in progress. The Texas Production Co.'s No. 17 State, NW SE Section 15-4-92, joint with the Kinney-Coastal Oil Co., is drilling at 1,935 feet. Same company's No. 6 Parkinson, NW cor. Section 23-4-92, is drilling at 2,615 feet, and No. 13 Parkinson, NE SW Section 22-4-92, is drilling at 1,565 feet. Alliance Oil Co.'s No. 1 Millikin, SW cor. Section 14-4-92, is preparing to run the 12½-inch casing at 600 feet, and the Shaffer Oil & Refining Co.'s No. 205 Yarg, NW NW Section 26-4-92, joint with the Yarg Producing & Refining Co., is drilling at 3,470 feet in the Lakota which was topped at 3,450 feet. On the Moffat Dome, the Texas Production Co.'s No. 10 Knowlton, Section 33-5-91, is being deepened from 4,426 feet in hopes of picking up a softer horizon as was done in the Midwest's No. 34-SD on the Iles Dome.

The Midwest has commenced running crude from the Iles Dome to Craig through its new 4-inch line. About 500 barrels a day will be shipped in tank cars to the Utah Oil Refining Co. at Salt Lake City and the remainder will be stored in its 55,000-bbl. tank at Craig.

Florence Pool

The Florence Pool in Fremont County is showing an increased number of wells drilling. Both the south extension and the west extension have been having some good completions. The Travis-Raddatz Syndicate's No. 16 Travis, Section 28-20-69, in the south extension, made 245 barrels the first 24 hours and Mojada Oil & Gas Co.'s No. 5, in the same area, made 140 bbls. initial. The Continental Oil Co. has started its No. 1 Kissenger & Wright, NE NW Section 4-19-70, in the west extension towards Canon City. This will be an interesting test as it is quite a distance farther west than the wells in Section 3 which recently proved up some new territory. The same company is also starting its No. 1 H. C. Watts, SE SE Section 35-18-79, an offset to a good producer recently brought in by the Florence Proven Fields Oil Co.

In Mesa County, on the western slope of the mountain range, the Eureka Oil Co.'s No. 2, Section 24-1s-1e, near Grand Junction, encountered a show of gas at around 300 feet, the gas being in sufficient quantities to burn a flame 12 to 15 feet high above the 8¼-inch casing.

Wyoming

A discovery which gives evidence of being a major one, but which will require several weeks to determine the facts, has been made in the Producers & Refiners Corp.'s No. 19, on the NW cor. SE Section 25-26-87, on the East Ferris Dome in Carbon County. The drill entered a sand, probably the Tensleep in the Pennsylvania formation, at 4,523 feet and 1 or 2 feet into the sand the well commenced flowing 25 bbls. an hour. The oil is light green in color and of about 36 gravity. This is one of the most interesting features of the development as the Embar-Tensleep sands in northern and northwestern Wyoming have all produced black oil of asphaltic base. The well is the first test drilled to the Pennsylvanian in Carbon County and as far as known the first in southern Wyoming. The only other place in the Rocky Mountain area that can be recalled where light green oil has been found in the Pennsylvanian was on the Colorado River structures in southeastern Utah. If the new discovery upon being drilled in, turns out to be a large producer, as it gives favorable evidence of being, it may revolutionize the entire situation as far as the exploration for oil in southern Wyoming and northern Colorado is concerned, and even should it run into water upon being drilled deeper, it will have yielded information of sufficient importance to warrant further testing. The well has 1,400 feet of open hole, the 8¼-inch having been set and cemented at 3,072 feet. The 6¼-inch is being run and will be carried to the top of the sand and the hole will be narrowed down to 4¾-inch for drilling into the sand. This probably will take two weeks or more, and until this is done, the full significance of the discovery will not be known.

The East Ferris well is in a region where exploration for oil has been going on for about 10 years and where millions of dollars have been expended by a number of companies. The East Ferris Dome is the most easterly of a series of highs on a major fold across Carbon County, among the other highs being the Middle Ferris, West Ferris, Wertz and Lost Soldier Domes, the latter being in Sweetwater County. The Middle Ferris, West Ferris and Wertz Domes are gas structures in the upper horizons and the Lost Soldier Pool is producing 2,500 to 3,000 bbls. a day from the Wall Creek and Dakota sands. On the East Ferris Dome three are several shallow wells in the Frontier. Last year the Producers & Refiners drilled a test which picked up a new sand at 2,620 feet which was named the Parco and which made 150 bbls. of black oil. The General Petroleum Corp drilled a number of wells on Section 16-25-86, one of which went to 4,640 feet, but wound up its campaign with only two small producers in the shallow horizons. The Wertz Dome had a test to the Sundance last year in which it is understood gas was found, but no well has been drilled to the Embar-Tensleep sands. The Producers & Refiners' No. 19, the discovery in the deep horizon, was reported to have had 250 barrels in the Sundance at 2,628-70 feet. Carbon County probably has had more wildcat wells drilled in it during the past 10 years than any county in Wyoming.

Oregon Basin

The Oregon Basin operation in Park County developed little new during the past week except the customary crop of rumors which this time are concerned with the building of a refinery. The reports are cloaked in considerable mystery and credit the movement to the Royal Dutch-Shell and to others. However, no confirmation has been obtained and there is considerable doubt as to there being anything tangible to it. Officials of the Chicago, Burlington & Quincy Railroad in Denver know nothing of land being leased for a refinery from its subsidiary and the local office of the Oil Well Supply Co. denied having had any negotiations for refinery equipment as reported. In fact, none of the oil companies have been able to furnish anything on the reports of the Royal Dutch-Shell people being active anywhere in the Rocky Mountain area except through their distributing subsidiaries which have been extending their marketing facilities.

The Ohio Oil Co.'s No. 1 Baston, NE cor. Section 6-51-100, on the south dome, which was reported having found a saturated sand in the Embar at 3,420-27 feet with a core drill, has moved its rotary tools to the No. 2 Wilson, NE NE Section 4-51-100, and is rigging up cable tools to drill in on the Baston well. The hole was filled with mud until the casing could be run and it probably will be several weeks before anything definite will be known as to what the well will make. After drilling is resumed it will have 100 to 200 feet to go and progress will be slow. The Cody Petroleum Co.'s No. 1 Klindt, SE NE Section 7-51-100, which found the Embar at 3,539 feet, is drilling at 3,655 feet and flowing 550 bbls. per day while drilling is in progress. It is still some 75 feet or more above the horizon where it is hoped to strike the big pay. Charles E. Orchard's No. 1 Rue, SW SW Section 28-51-100, on the south dome, has been delayed at 3,520 feet by a fishing job that appears to be a bad one. The drillers were running the 6⅝-inch casing when the string of 2,600 feet dropped 900 feet. Equipment has been ordered with which to try to fish it out. If it is found that the hole is in too bad a condition to go ahead, the rig will be skidded and another hole started. This is a keen disappointment as the well was nearing the objective and probably would have been the next one to reach the sand.

The Producers & Refiners Corp.'s No. 1 Frisby, SW NE Section 32-52-100, is about ready to resume drilling at 1,400 feet after changing over to rotary tools. This well will be watched with interest as it is logging about 400 feet higher than the No. 1 Klindt. The Ohio Oil Co.'s No. 4 Sonners, Section 8-51-100, is still fishing at 3,056 feet, and its No. 2 Wilson, 4-51-100, is rigging up rotary tools to spud. Cody Petroleum Co.'s No. 2 Klindt, Section 7-51-100, is drilling at

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SKIFF FIELD DISCOVERY WELL NOW REPORTED MAKING 240 BBLS.

By Victor Lauriston
Staff Correspondent, Canadian Fields

CHATHAM, Ontario, Feb. 18.—In the Skiff Field, southern Alberta, the Devenish Petroleum's No. 1, discovery well, LSD 5, Section 27-5-14w4, has after many difficulties been placed on the pump and is reported producing at the rate of 10 bbls. an hour. Production was encountered in this well last spring at 3,090 feet, and later the test was continued to the top of the Madison limestone without securing additional production. The well was then finished in the original producing horizon and put on the pump about January 1. After pumping started the cement plug placed below the oil sand failed to hold, and considerable water intrusion resulted; and later, sands from below clogged the pump, causing some damage. These troubles have since been overcome, the water effectively shut off, and the well is making 240 bbls. a day which is practically the original reputed production. Shipments will be made to the Imperial Oil, Ltd. refinery at East Calgary, which has contracted to take the entire output, the crude being trucked to Skiff, about 7 miles, and there loaded in tank cars. The production is a heavy crude, around 20.3 Baume.

Further development of the field will be carried on by Imperial Oil, Ltd. under an arrangement made last year with Devenish Petroleum, Ltd. It is understood two tests will be started early in the spring. The locations have not been announced, but it is understood they will be a little west of Devenish Petroleum's No. 1, and about 140 feet higher on the structure. The Imperial-Devenish arrangement calls for the drilling of a total of 10 wells in this area, and it is understood two strings of tools will be at work simultaneously throughout the season.

Viking Field

In the Viking Field, east central Alberta, Hudson's Bay-Marland Oil Co. of Edmonton is planning to spud in its No. 1 test in Section 8-49-12w4, some 8 miles northeast of Viking. This is a deep test for gas on Hudson's Bay leases in the heart of the Viking gas field; Northwestern Utilities, Ltd. having contracted to take any gas developed. The Hudson's Bay-Marland Oil Co. has secured gas rights also on acreage of independent landowners in the vicinity, and this also will be tested, leases, it is understood, calling for a 10 per cent royalty on both oil and gas. Drilling will be carried to 3,500 feet or more is necessary, with a view to tapping a potential gas sand underlying the 2,100-foot Viking sand. Standard cable tools will be used. Casing and equipment have been ordered for No. 1 test, which will spud in about April 15. This is the first drilling undertaken by the Hudson's Bay-Marland Oil Co. in Canada; and is primarily intended to secure the company some returns from acreage in the Viking Field which is practically certain to produce gas in the Viking sand and may be productive also in a lower horizon. Deep drilling may develop some oil production, but this is not regarded likely.

Turner Valley

In the Turner Valley Field, United Oils, Ltd., has located its No. 1 test in LSD 2, Section 24-20-3w5. The location is about 1,000 feet north of Dalhousie's No. 6 and about 1,500 feet north and east of the Vulcan's No. 1 crude naphtha producer. The test will spud in as soon as possible. United Oils, Ltd. is one of the few surviving companies that operated at the time of the first Calgary boom in 1914. At that time it secured considerable acreage in the Turner Valley Field, and drilled one test there to approximately 3,000 feet depth. Later the company transferred its operations to the Sweetgrass area of southern Alberta, where its United No. 3 gasser led ultimately to the opening of the present Foremost Field. The company has in recent years added materially to its holdings in the border areas, and has extensive acreage in the new Skiff Field, and also holds a considerable interest in Devenish Petroleum, Ltd., which drilled the first producing well in the Skiff Field. Since the collapse of the Calgary boom, United Oils, Ltd. has kept its leases in good standing, and today holds a large amount of promising

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Definite Upward Trend in California

Long Beach Development Delayed but Expected to Show Increase During March and April With Peak in May

By L. P. Stockman
Staff Correspondent, California Fields

LOS ANGELES, Calif., Feb. 18.—A very definite strengthening has been noted in the daily production of the Long Beach Field during the past three weeks and although pipe line runs at the present time are only approximately 6,000 bbls. per day in excess of those at the close of January, this indicates a definite upward tendency. Development work at Long Beach during the current year to date is running slightly behind schedule and consequently field production has not registered the anticipated consistent increase from week to week, due principally to infrequent completions. New wells should become more numerous from now on, however, and while the peak production of this field may not occur until along about May, the daily output should begin climbing during the latter part of February and show a substantial increase during March and April Several satisfactory completions have been finished in this field during the past month and the three finished during the current week came up to expectations.

The Bolsha Chica Oil Corp. carried off completion honors during the past seven-day period by finishing No. 4 Mutual in the deep zone at 5,965 feet. This new well showed an initial flow of 2,495 bbls. of clean 30.1 gravity oil and approximately 2,600,000 feet of wet gas daily. The Bolsa Chica established a nice drilling record on this project, only about 50 days being required from spud to completion. The McKeon Drilling Co. chalked up another good well when No. 1 McCrate was brought in a few days ago flowing 1,375 bbls. of clean 29.9 gravity oil and 1,000,000 feet of wet gas daily from 6,179 feet. This new producer, which gives the McKeon Drilling Co. a present daily production at Long Beach of a little better than 5,000 bbls., is flowing through a 46/64-inch bean under a pressure of 975 pounds. The McKeon's No. 2 Evans, which came in two weeks ago flowing 2,375 bbls. daily from 5,962 feet, has been consistently building up from day to day, the output during the first 24 hours being 2,816 bbls This is 441 bbls. in excess of the initial production. The B. & H. Oil Co. recompleted No. 2 Long Beach after redrilling and deepening it from the upper zone to 5,932 feet and while it only showed a maximum run of 410 bbls. daily this was due to mechanical trouble, the 4¾-inch oil string becoming frozen several hundred feet off bottom.

The A. T. Jergins Syndicate will undoubtedly start several additional projected deep sand wells in the Long Beach Field within the next 30 days, due to a recent readjustment of future royalty payments. The Jergins interests secured a lease from the city of Long Beach on 140 acres of municipally owned land back in 1921 and while the original requirements called for a 40 per cent royalty on all oil and gas produced a substantial reduction has been mutually agreed upon and this will undoubtedly stimulate additional work. The Jergins interests completed lease requirements some time ago, having drilled 23 wells up to date, the greater part of which carry a 40 per cent royalty. The recent deep sand exploitation resulted in a revision of the original royalty payments and as an inducement to stimulate additional work the municipality has reduced the royalty payments on future completions to 22½ per cent, provided that the new production comes below the 5,100-foot level.

The city of Long Beach has been exceptionally fortunate in the development of municipally owned land, a recent report indicating total royalty receipts by the city in excess of $6,000,000 from oil and gas production.

Seal Beach

George F. Getty will probably be in a position to make a conclusive test of the recently discovered deep zone in the Alamitos Heights section of the Seal Beach Field some time within the next three weeks as his No. 12 Alamitos was rotating ahead at 6,250 feet a few days ago. No 1 Bonner of the Richfield, the first and only successful completion in this new deep zone below the 6,000-foot level, averaged a little less than 400 bbls. per day during the past week. The Marland killed No. 16 Selover three or four days ago and this well, which offsets the intensely drilled town lot area, will be reconditioned and an attempt made to remedy the water trouble which has prevented clean, substantial production. Nos. 11 and 16 on the Selover property, both of which were given preliminary production tests several weeks ago from the 6,600-foot level, require additional work and although they showed an initial of better than 1,500 bbls. per day the water content was running in excess of 25 per cent. The origin of this water has not yet been determined although every indication points to bottom water. The probable existence of around 500 feet of oil sand possibly capable of resulting in substantial production may prove an important factor in state production later this year and it is needless to say, therefore, that future deepening operations in this field will be watched with considerable interest.

Brea Olinda

No. 16 Orange, the big well finished by the Shell at Brea Olinda some 10 days ago, is holding up in good shape, the average daily production during the past six days being 4,275 bbls. In addition to the crude produced, this new well is yielding 2,800,000 feet of natural gas which is running a little better than 2 gallons of casinghead for each 1,000 feet of gas treated. For several days No. 16 Orange flowed a barrel of oil for every foot of hole drilled, 4,623 feet. The Shell has another immediate potential producer on the Orange property, No. 14, and unless something unforeseen develops this project, which is about 300 feet away from No. 16, should be tanking oil within the next three weeks. Only a limited amount of development work is being undertaken in the Fullerton, or Brea Olinda, Field at the present time and no change is anticipated for the next several months. The Union Oil Co., which is running six strings of tools in the Richfield district at present, is scheduled to finish three new producers within the next 30 days.

The past week was a very busy one at Huntington Beach, four new wells being put on production during the period in question. The World Petroleum Corp. started the ball rolling by completing No. 8 M. & M. in the town lot area as a 330-bbl. pumper from 4,190 feet, the hole having been plugged back from 4,292 feet because of bottom water. The Standard also added a new completion during the week, No. 33 Bolsa, a new well, coming in under a natural flow making 525 bbls. of clean 27.1 gravity oil daily from 3,748 feet. J. E. Garliep's No. 2 Huntington followed a short time later and this new producer showed an initial flow of 472 bbls. of exceptionally clean 21.4 gravity oil daily from 3,955 feet, the hole being finished with a 6¼-inch liner carrying 255 feet of perforated The Western Drilling & Production Co. brought in No. 1 Humphreys during the latter part of the week but it was a distinct disappointment as it only pumped 25 bbls. of 20.1 gravity oil daily from 3,881 feet.

Ventura Avenue

The Associated chalked up another good well in the Ventura Avenue Field during the early part of the week and this new producer, No. 35 Lloyd, made 2,822 bbls. of clean 30.4 gravity oil and 3,000,000 feet of wet gas during initial 24-hour test. No. 35 Lloyd, in contrast to several recent deep wells finished in this field, was only carried down to 5,600 feet, the hole being finished with a 9-inch oil string. The Associated is reaming

(Continued on Page 165)

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Company, Well and Location—	S-T-R	Depth	Status
Associated, No. 1 Cypress, Potrero	34- 2-14	5,408	recemented
Associated, No. 2 Cypress, Potrero	34- 2-14	2,411	hd. sd. drilling
Smith & Carpenter, No. 1 Smith, Potrero	35- 2-14	5,408	gas well
Pet. Securities, No. 1 Connolly, Potrero	27- 2-14	3,791	sd. sh. drilling
Hurst Oil Corp., No. 1 Inglewood, Los Angeles Co.	28- 2-14	3,772	suspended
Mont. Park Oil Co., No. 1 Browning, Monterey Park	26- 1-12	3,940	suspended
Associated, No. 1 Patterson, Pico	13- 2-12	5,120	hd. sd. drilling
Circle Oil Co., No. 1 Pomeroy, Manchester	23- 3-14	4,280	suspended
Shell, No. 1 Mission, San Fernando	4- 2-15	4,950	fishing
Carr, O. K., No. 2 Foster, San Juan Capistrano	13- 8- 8	4,230	suspended
Andrews, Otis, No. 1 Lancaster, Los Angeles Co.	23- 3-13	1,102	sd. drilling
Southwest Pet. Co., No. 1 Ramsauer, Watts	4- 3-13	4,302	suspended
Security Pet. Co., No. 1 Lynwood, Los Angeles Co.	13- 3-13	3,560	hd. sd. drilling
Dominguez Ext., No. 1 Compton, Los Angeles Co.	27- 3-13	5,510	pipe trouble
San Clemente Oil Co., No. 1 Peck, Hawthorne	20- 3-14	5,760	suspended
Shell, No. 1 Dupree, Hawthorne	29- 3-14	5,304	to deepen
Scott & Currier, No. 1 Hawthorne, L. A. County	33- 3-14	Rig	rigging up
Whi e Behr, No. 1 Watson, L. A. County	21- 4-14	4,610	land pipe
Buttrum, F. W., No. 1 Richfield, Orange Co.	36- 3- 9	2,640	sd. sh. drilling
Son. C. A., No. 1 Pinkerton, Orange Co.	5- 5-11	3,620	may abandon
Ohio Oil Co., No. 1 Anaheim, Orange Co.	9- 4-11	M l.	building rig
Olympic Refg. Co., No. 1 Sunset Beach, Orange Co.	19- 5-11	3,800	gr. sd. drilling
Getty, George F., No. 1 Seal Beach, Orange Co.	14- 5-12	992	temp. suspend.
Shell, No. 1 Stern, Orange Co.	22- 3-10	3,920	hd. sd. drilling
Hemet Pet. Co., No. 1 Ward, Riverside Co.	9- 3- 1	2,130	hd. sd. drilling
Mesa Pet., No. 1 Newport, Orange Co.	21- 6-10	1,910	hd. sd. drilling
Davenport O. & G., No. 1 San Marcos, San Diego	30-12- 2	355	hd. sd. drilling
Turner, S. S., No. 1 Escondido, San Diego Co.	25-12- 2	320	sd. drilling
Mills, J. P., No. 1 Pueblo, San Diego Co.	18-15- 3	2,005	hd. sd. drilling

IMPORTANT NORTHERN CALIFORNIA WILDCATS

General Pet., No. 2 Ochsner, Kettleman Hills	28-22-18	6,598	br. sh. drilling
South Coalinga, Well No. 1, Kettleman Hills	35-24-19	3,056	sd. sh. drilling
Monocline Dev. Co., Well No. 1, Kettleman Hills	7-21-21	4,308	suspended
McPhail, Hugh, Well No. 1, Kettleman Hills	13-24-18	2,095	suspended
Milham Explt'n., No. 1, Kettleman, Kings Co.	2-22-17	6,580	br. sh. drilling
Shell, No. 2 Berlywood, Moorpark	32- 3-20	6,420	pipe trouble
Star Petroleum, No. 2 Cane, Ventura Co.	13- 3-23	5,290	hd. sd. drilling
Standard, No. 3 Saticoy, Ventura Co.	9- 3-22	1,280	abandoned
Standard, No. 4 Saticoy, Ventura Co.	18- 3-22	.....	location
Exline, Emma, No. 1 Saticoy, Ventura Co.	33- 3-21	rig	rigging up
Petroleum Sec., No. 1 Diablo, Ventura Co.	26- 5-18	4,214	hd. sd. drilling
Parkford, E. A., No. 1 Strathern, Ventura Co.	5- 2-18	4,002	suspended
Shell, No. 1 Strathern, Ventura Co.	6- 2-18	3,165	hd. sd. drilling
Shell, No. 1 Oxnard, Ventura Co.	36- 2-22	1,210	sd. hd. drilling
Miley Oil Co., No. 1 Red Mountain, Ventura Co.	7- 3-23	980	clean. out
Keck Inv. Co., No. 1 Fillmore, Ventura Co.	35- 4-20	3,515	hd. sd. drilling
McAdams, J. E., No. 1 Buttonwillow, Kern Co.	26-29-23	4,685	br. sh. drilling
Milham Explt'n., No. 1-A Buttonwillow, Kern Co.	8-28-23	4,662	gas well
Milham Explt'n., No. 2 Buttonwillow, Kern Co.	8-28-23	2,730	gas well
Milham Explt'n., No. 3 Buttonwillow, Kern Co.	8-28-23	1,893	sd. drilling
Doheny-Stone, No. 1 Buttonwillow, Kern Co.	7-29-24	4,150	will deepen
South'n Calif. Gas Co., No. 1 Buttonwillow, Kern Co.	4-28-23	2,268	gr. sd. drilling
Semitropic Oil Co., No. 1 Semitropic, Kern Co.	21-26-22	1,618	hd. sd. drilling
Pacific Eastern, No. 1 Union Ave., Kern Co.	6-30-28	5,590	hd. sd. drilling
Pacific Eastern, No. 2 Union Ave., Kern Co.	6-30-28	3,165	sd. sh. drilling
O'Donnell, J. E., No. 1 Greenfield, Kern Co.	31-30-28	150	sd. drilling
Superior Oil Co., No. 1 Edison, Kern Co.	24-29-29	1,143	hd. sd. drilling
Stabler, W. W., No. 1 Comanche Point, Kern Co.	23-32-29	rig	rigging up
Midway Northern, No. 1 Edison, Kern Co.	29-29-30	2,850	hd. sd. drilling
Shell, No. 1 Mon Bluff, Kern Co.	9-28-29	4,128	hd. sd. drilling
North American, No. 1-A Delano, Kern Co.	5-25-26	3,951	sd. sh. drilling
Fresno Madera Oil Co., No. 1 Clovis, Fresno	18-12-21	4,005	hd. sd. drilling
Barneyberg Oil Co., No. 1 Brown, San Luis Obispo	26-32-14	2,296	hd. sd. drilling
Richfield, No. 1 Wreden, San Luis Obispo Co.	10-29-17	3,080	hd. sd. drilling
Miley Oil Co., No. 1 Carissa, San Luis Obispo Co.	15-29-17	2,540	suspended
Union Oil Co., No. 1 Huasna, San Luis Obispo Co.	34-32-15	708	clean. out
San Luis Syndicate, Well No. 1, San Luis Obispo Co.	29-31-15	2,219	will test
Sequoia Oil Co., Well No. 1, San Mateo Co.	13- 7- 5	1,250	hd. sd. drilling
Shell, No. 1 Cowell, San Mateo Co.	8- 6- 5	5,785	hd. sd. drilling
Shell, No. 1 Butts, San Mateo Co.	16- 6- 5	1,753	sd. drilling
Shell, No. 1 Mossi, Petaluma	8- 5- 6	1,500	hd. sd. drilling
Thomas & Hammill, Well No. 1, Alameda Co.	16- 3- 3	1,070	water trouble
Tepesquit Oil Co., Well No. 1, Santa Barbara Co.	3- 9-32	1,680	sd. drilling
Becker, Geo. F., No. 1 Summerland, Santa Barbara	33- 4-25	3,040	br. sh. drilling
Twin State Oil Co., No. 1 Modoc, Santa Barbara Co.	20- 4-27	2,600	sd. sh. drilling
Fort Wayne Synd., No. 1 Goodcell, Madera Co.	22-10-17	2,250	skid. rig
Continental Oil Co., No. 2 Smith, Colusa Co.	31-18- 4	4,300	fishing
Colusa Oil Co., Well No. 1, Colusa Co.	31-15- 4	240	hd. sd. drilling
Marland Oil Co., No. 1 Bradley, Monterey Co.	32-24-11	rig	rigging up
Shell, No. 1 Bradley, Monterey Co.	32-24-12	.....	location
North Coun ies Oil Co., Well No. 2, Humboldt Co.	36- 2- 1	1,700	hd. sd. drilling

TANKER SHIPMENTS FROM LOS ANGELES TO ATLANTIC AND GULF COAST PORTS

Commodity—	Total This Week	Daily Average	Total Last Week	Daily Average	This Year to Date	Same Time Last Year
Crude oil	176,920	25,274	171,798	24,543	1,105,624	1,162,593
Fuel oil	.....	.....	.....	.....	.....	1,341,031
Diesel and gas oil	97,957	13,994	93,476	13,354	357,089	518,020
Gasoline	223,445	31,921	413,109	59,016	1,652,625	1,506,178
Coastwise—						
Crude oil	68,024	9,718	336,992	48,142	1,688,435	4,306,275
Fuel oil	508,735	72,248	346,950	49,564	2,428,920	2,189,741
Diesel and gas oil	.....	.....	424	61	170,723	19,574
Gasoline	235,292	33,613	256,452	36,636	1,486,478	1,314,027
Kerosene	.....	.....	1,539	220	13,050	31,666
Tops	.....	.....	.....	.....	30,500	.....
Exports—						
Crude oil	70,119	10,017	72,102	10,300	323,001	489,783
Fuel oil	584,652	83,522	388,141	55,449	3,386,195	4,061,766
Diesel and gas oil	108,647	15,521	70,932	10,133	413,284	83,906
Gasoline	68,331	9,762	128,943	18,420	619,526	468,384
Kerosene	146,489	20,927	112,016	16,002	595,890	281,669

TANKER SHIPMENTS FROM SAN FRANCISCO TO ATLANTIC, GULF COAST PORTS

Diesel and gas oil	.....	.....	.....	.....	167,695	251,458
Gasoline	.....	.....	.....	.....	154,238	172,907
Lubricants	.....	.....	.....	.....	69,854	58,110
Coastwise—						
Fuel oil	57,203	8,172	.....	.....	488,305	943,342
Diesel and gas oil	16,931	2,419	.....	.....	18,409	134,308
Gasoline	52,172	7,453	143,193	20,456	378,330	539,275
Kerosene	2,515	359	4,871	696	37,248	7,353
Exports—						
Fuel oil	103,981	14,854	.....	.....	437,306	222,042
Gasoline	.....	.....	12,752	1,822	582,447	597,960
Kerosene	.....	.....	.....	.....	80,391	209,304
Lubricants	.....	.....	.....	.....	.....	9,120

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Tennessee Reports 960 Barrel Well

Clay County Test Starts Flowing 50 Bbls. an Hour. Largest Completion in State in 30 Years. Lecta Pool Has 400-Bbl. Well

By Whit
Staff Correspondent, Kentucky-Tennessee

BOWLING GREEN, Ky., Feb. 20.—Some mighty good wells are reported from the Kentucky-Tennessee Fields, the banner producer being found by the Carnahan Oil Co. in a second test on the Joe Moredock farm, in Ashburn Creek, in the eastern part of Clay County, Tennessee, which started flowing at rate of 50 bbls. an hour, and for the first 24 hours the well is credited with a production of 960 bbls. and is still holding at a reported flow of 40 bbls. per hour, making it one of the largest producers found in the State since the early days when the Bob Barr well was found in Fentress County, something like 30 years ago. This well will eventually cause much drilling in that part of Clay County, which is only about 5 miles east of the village of Willow Grove. The oil is reported found at around 750 feet, approximately 151 feet below the Pencil Cave formation. The original well on this lease is holding at its initial production of 70 bbls. daily.

A 400-bbl. well is reported on the Casey Jones lease in the Lecta Pool of the Glasgow Field, in Barren County, in western Kentucky. In Ohio County, No. 3 on the Bob Hamilton farm, near Mount Moriah Church, is reported at 319 bbls. in 24 hours. Two 150-bbl. wells in Nos. 6 and 7 Bart'ett heirs farm, same county, while No. 10 Cora Wells farm in the Ambrose Pool showed 150 bb's. initial, and No. 6 on the Hill Rhodes farm, same pool, 100 bbls. A wildcat on the Jim Brown farm, in the southern part of Daviess County, is reported better than 300 bbls. initial and opening up quite an area of good-looking territory.

Week's Work

A summary of the week's work in the Kentucky Field shows 13 completions, 11 producers with an initial of 1,689 bbls., and 2 dry holes. Compared with the previous week, there were 9 less completions, 781 bbls. more production, and 1 less dry hole. The wells were distributed as follows:

County—	Comp.	Oil wells	Prod.	Dry
Ohio	8	8	964	0
Daviess	4	2	325	2
Barren	1	1	400	0
Total	13	11	1,689	2
Last week	22	19	908	3
Difference	9	8	781	1

Western Kentucky

Only three counties in Kentucky were listed for the week with completions, all being in the western division, comprising Ohio, Daviess and Barren Counties. No completions were reported from the eastern division.

Traveling over the fields of the western part of the State at this time is impossible except afoot, horseback, or two-horse road wagon, the latter being dangerous, as the roads are bottomless with holes that sometimes upset a road wagon. Most of the oil men have been taking it afoot, except in some places where the road has had some attention and saddle horses are obtained.

Late Completions

While Ohio County to a large extent has been getting the big producers of the Tri-County Fields, Daviess County, is coming rapidly to the front. The real work started in a wi dcat way when the Hayden farm well was brought in some few weeks ago and was helped along by the good well found by the Dimmick Brothers on the Ratliff farm across the line in McLean County, both of which are now connected to the Illinois Pipe Line Co. and are among the good wells of that part of the State.

The latest sensation in the Daviess County Field is in the southern part of the county and drilled by Miller & Damron, of the Creek Drilling Co., on the Jim Brown farm, is reported as flowing 300 bbls. initial. This well was 4 miles away from the pipe line which has been put in, and 1,600 bbls. of crude is said to have been run from the new well. It required about four days to make the connection, which means that the pipe line company rushed the line through as it always does in an emergency case. The Wood Oil Co. is reported to have brought in a well good for 25 bbls. at a test on the Alfred Sutton farm, near Hewlett's Store, on the Hartford Road, out of Owensboro.

The Ohio Oil Co.'s test on the McLemore farm, near the town of Panther, in Daviess County, is reported a dry hole at a depth of 1,500 feet. Bert Thompson's second test on the Frank Pulliam farm is also reported dry in the same county.

In Ohio County, southeast of the Ambrose Pool, near Mount Moriah Church, the Cumberland Petroleum Co. and others' No. 3 on the Bob Hamilton farm is reported with an initial production of 319 bbls. No. 4, same farm, is rated at 70 bbls., and No. 5 is making a showing in a class of the better producers found on the lease, with Nos. 6 and 7 under way.

Ambrose Pool

In the same county, the Mecca Oil Co.'s No. 10 well on the Cora Wells 130 acres, in the Ambrose Pool, is a 150-bbl. initial producer. In this well a string of 666 feet of casing was set, sand at from 666 to 701 feet and drilled to a total depth of 710 feet and shot with 120 quarts. Daugherty and others' No. 6 on the Hill Rhodes 150 acres, same pool, is a 100-bbl. well. In this well 761 feet of casing was set, with sand from 761 to 795 feet and shot with 120 quarts.

In the same pool, the Creek Drilling Co.'s No. 6 on the Bartlett heirs' 81 acres produced 150 bbls. initial, with a string of 727 feet of casing, sand from 727 to 759 feet, and drilled to a total depth of 773 feet and given a 120-quart shot. No. 7, same farm, is also a 150-bbl. well.

In the Colyer Pool, Ohio County, S. H. Russell and others set a string of 395 feet of casing, got sand from 405 to 429 feet and went to a total depth of 430 feet at No. 2 on the Latney Rhodes farm, and shot with 60 quarts, resulting in a 25-bbl. initial well.

In the Sunnydale Field, Ohio County, the Wood Oil Co.'s second well on the R. A. Duke 200 acres, produced an initial of 20 bbls. A string of casing was set at the top of the sand at 440 feet and 14 feet of sand was drilled through and a pocket 12 feet below the sand was drilled to a total depth of 466 feet and shot with 60 quarts.

In the Lecta Pool of the Glasgow Field, in Barren County, the Sampson Oil Co.'s No. 6 on the Casey Jones farm is reported with an initial of 400 bb'ls., being the best well found in this county for a long period, and will bring about a more active drilling campaign when weather conditions become better.

Field Pickups

The Leeper Oil Co.'s No. 1 on the McKinley farm, offsetting No. 1 Foreman, just east of Bells Run, in Ohio County, and northwest of the Ambrose Pool, is reported making a good showing. This is in the late ex'ension to the Ambrose Pool to the northwest a short distance to Daly & Lohman's production on the Ollie Ezell lease, where No. 4 on the 50 acres and Young & Lee are drilling their No. 3 on the Ollie Ezell 80 acres.

Dimmick Brothers are drilling No. 1 on the Ford farm, which is an offset to the firm's initial well on the Ratliff farm in McLean County. This well should reach the pay sand within a short time, as the drill was reported close around 1,100 feet, and the firm's well on the Ratliff got its pay at 1,410 feet. Young & Murray are getting close to a depth of 1,000 feet at a test on the Lloyd Leachman farm, same county, and starting a test on the Len Mitchell farm, near the Wyman schoolhouse, in the same county. R. P. Rowe and others are also drilling a well near the Dimmick well on the Thomas farm. No. 2 on the Ratliff farm is drilling for the Dimmick Brothers.

In Daviess County, C. L. Young and others are drilling Nos. 2, 3 and 4 on the W. G. Hayden farm. Noe and others are getting close to the sand at a test on the Bailey farm, near Masonville, and should reach pay sand at a test on the Whitley Deer farm, about 3 miles south of Owensboro. The well on the Mayes Beck farm, in the vicinity of the Hayden well, is down close around 800 feet and is being watched with much interest. D. J. Bolling and others' test on the Hazel Miller-Aud farm is making a light showing. Leeper Oil Co. is drilling No. 7 on the John Roby 91 acres in the Roby Pool, southeast of St. Lawrence. James C. Ellis is drilling a test on the Louis I. Igleheart farm, south of Moseyleville, and 1½ miles north of the McLean County line. Conrad Kipp and others are at work at No. 1 on the Mattingley heirs farm of 100 acres. Percy Jolly and others are starting a test on the Jeff Leet 68 acres, while Fred Estes and others are doing the same on the Massie Brothers farm near the town of Habit.

Report is that the Pure Oil Co. will shoot the Stevens farm well at Brown Valley drilled by Percy Jolly and others of Cleveland, Ohio, in an effort to develop the ability of that well for oil. With an enormous flow of water out of this well and a fairly good flow of oil, the operator hopes to be able to make a profitable oil producer from it, which would add some additional producing territory to the Daviess County Field.

Important Test

The Lea & Hohlinde Oil Co. is starting an important test on the 523-acre trace of Mrs. Daisey Iea and Henry Hohlinde, a mile southwest of the Gilbert Jolly farm produce in western part of Ohio County and a couple of miles west from Buford. This has been an active leasing area since the completion of the well on the Jolly farm and the new well is just far enough from production to attract attention.

In the test of R. P. Rowe and others on the Sands farm, in the western part of Ohio County, that struck a 300,000-foot gas well at a depth of 1,050 feet, and 'ower down an oil showing, the drillers are experiencing a great deal of trouble because of the spraying of oil over a wide territory by the gas. The contractor says he is now close to the same sand in which the Hayden and Brown wells got their rich oil pay. Goldburg & Young are down close to 800 feet at a test on the Lem Sparks farm, a short distance from the Sands test.

James C. Ellis' test on the C. Hoover farm, south of Taffy, in Ohio County, is showing for a big producer, some estimating it good for 300 bbls. A sand of a thickness of 40 feet was penetrated by

(Continued on Page 209)

BEST PRODUCER IN CENTRAL WEST IN "LITTLE OKLAHOMA POOL"

By Whit
Staff Correspondent, Central West

FINDLAY, Ohio, Feb. 20.—The best completion of the week in any area of the Central West Field, was credited to the "Little Oklahoma Pool," in southern Vigo County, Indiana, where No. 2, on the W. F. Collins farm, is reported with an initial of 75 bbls. The next best producer was No. 8 on the J. A. Bryan farm, near McComb, in Pleasants Township, Hancock County, for 35 bbls. Several fair sized gas wells were found in the Central Ohio Field, otherwise features were lacking, due to the changeable weather and bad condition that prevails.

Operators in the Lima Field of northwestern Ohio are taking things easy and will not do any active work until the spring season comes when work can be done to an advantage and at a much less cost than during the extreme cold weather. High waters have prevailed along the many streams that pass through the field. Only five completions were made in the territory since the last review.

South of Toledo, and between there and Woodville, Charles F. Zeising and others' test, 400 feet from the north line and 1,000 feet from the west line of the A. R. Metzger farm, in the southwest quarter of Section 8, Troy Township, Wood County, proved a dry hole. Sand was topped at 1,230 feet and went to a total depth of 1,268 feet, or 38 feet into the Trenton sand.

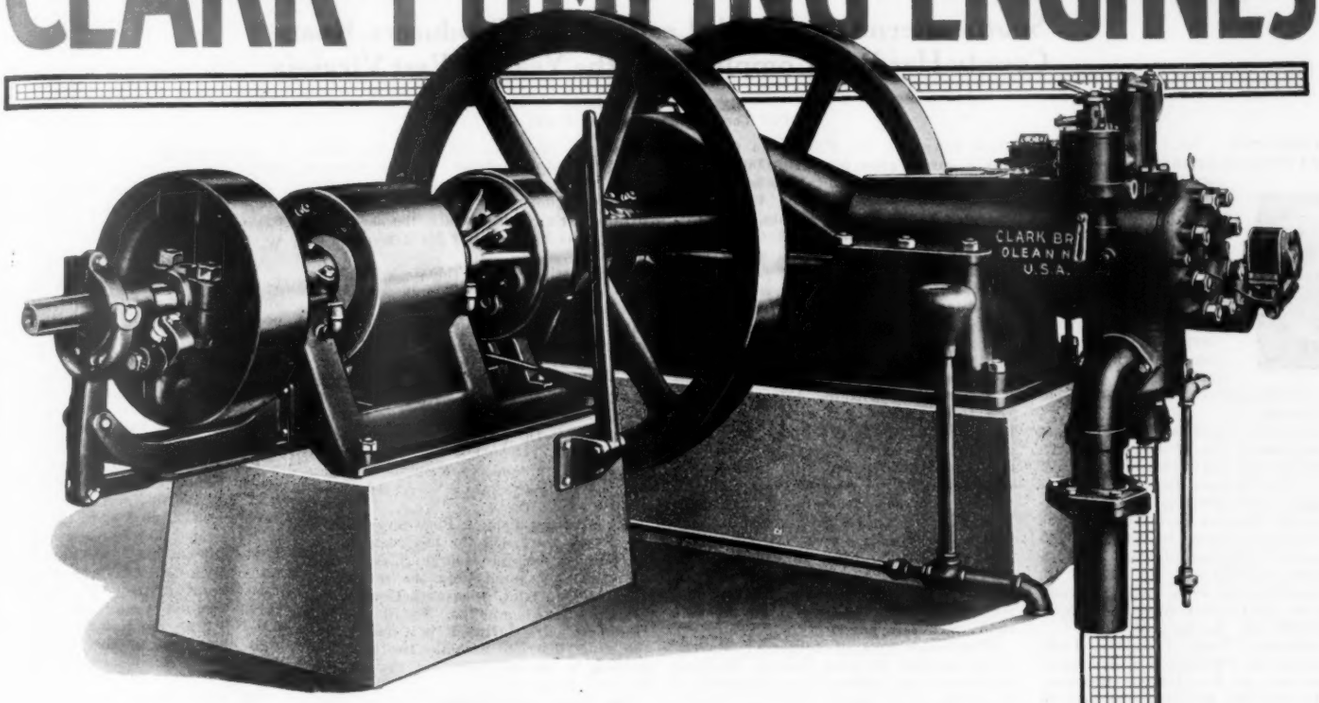
Near McComb, in Pleasants Township, Hancock County, the Bath Township Oil Co.'s No. 8 well, 530 feet from the north line and 1,270 feet from the east line of the John A. Bryan farm, in the southwest quarter of Section 14, produced 35 bbls. natural initial production from a total depth of 1,428 feet. Trenton was struck at 1,395 feet and drilled 33 feet in the sand. This is in the northwestern part of the county. In the eastern part of the same county, in Delaware Township, John Briggs has staked a location for a test on his farm, along the Lincoln Highway, 2 miles north and 3 miles west of the town of Forest. This will be quite a test although a few wells have been drilled in the past a short distance from the new venture. The location on the Briggs farm is about a quarter mile east and 20 rods north of the Jay Callihan well, which is a producer owned by the Bunkirk Gas & Oil Co., also about one-sixth of a mile east and 20 rods south of the Will Moore farm well owned by the same company and a gas well. It is farther on a straight line between the old Ike Wright well and the Callihan well, being about three-quarters of a mile from the Ike Wright well, the Wright well being further north and east. Temple, Hill and Kennedy, contractors from Findlay, are doing the work and have the drive pipe set and drilling going on. The outcome of this well will be watched with interest.

Lost Dome Development

Another area in that same vicinity destined for an active development is the structure known as the "Lost Dome," which covers an area of 15 miles from northwest to southeast and 8 miles wide

(Continued on Page 212)

CLARK PUMPING ENGINES



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BORED MAIN BEARINGS have reversible, bronze-backed babbitt liners.

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CLARK

Better Than Average Wells in the East

Southeastern Ohio Fields Lead in Good Producers. Roane County Has Best Completion of the Year in West Virginia

By D. S. Wakenight
Staff Correspondent, Eastern Fields

PITTSBURGH, Pa., Feb. 20.—In place of the inactivity that has been prevailing and the reports of small completions, there have been several fair wells brought in during the past week in the Eastern fields. The number of completions has not materially increased during the week, but most of these produced. The outlook remains unchanged with fewer new locations reported.

The deep sand territory in southeast Ohio had nearly all of the good wells completed during the week. In the SW of Section 16, Jackson Township, Guernsey County, the Preston Oil Co. completed in the Niagara lime No. 8 on the W. C. McCourt farm. It produced 135 bbls. the first 24 hours after drilled to a total depth of 3,635 feet. In Section 16, same township, the same company's second test on the Charles Wiggington farm produced 90 bbls. the first 24 hours.

In Section 1, Perry Township, Licking County, the Pure Oil Co. completed a second test on the Hoover Brothers' farm. It produced 128 bbls. the first 24 hours after shot in the Clinton sand.

Muskingum County

In the SE of Section 2, Licking Township, Muskingum County, the Hope Construction & Refining Co. completed and shot in the Clinton sand a test on the Edward T. Morgan farm. The well responded with a production of 100 bbls. the first 24 hours. In the NW of Section 21, Harrison Township, Perry County, the Fairview Oil & Gas Co. has a 75-bbl. producer in the Clinton sand at a test on the L. Gregg farm.

In Section 21, Harrison Township, Perry County, Ohio, Valley Petroleum Co. completed No. 1 on the S. M. Springer farm in the Clinton sand at a depth of 3,560 feet, and after a shot the well produced 85 bbls. the first 24 hours.

In the SW of Section 15, Jackson Township, Guernsey County, the Preston Oil Co. has completed in the same formation a second test on the J. H. Fulton farm, good for not more than 5 bbls. a day.

Licking and Washington Counties

In Section 21, Fallsbury Township, Sterl C. Brown & Co. completed in the Berea grit No. 7 on the F. H. Baughman farm. It produced 20 bbls. the first 24 hours after shot. In the NW of Section 16, Aurelius Township, Washington County, Isaac Atkinson completed No. 3 on his own farm. It is a light pumper in the Macksburg 300-foot farm.

In the SE of Section 14, Richland Township, Holmes County, the South East Ohio Gas Co. completed in the Clinton sand a test on the Richard Roby farm. It is a gasser good for 1,750,000 feet. For some time the Southeast Ohio fields have been completing more than the usual number of gas wells. In Newport Township, Washington County, Burton and others have completed in the first Cow Run sand a second test on the John Vanwey farm. It is a duster.

Morgan County

Five miles west of Chesterhill, in Section 25, Marion Township, Morgan County, the Morgan Oil & Gas Co. has completed a second test on Nathan Woodyard farm. It is a gasser in the Berea grit stray sand good for 400,000 feet. Three miles west of Chesterhill in fractional Section 35, same township, Carl Hallowell has completed in the same formation a test on the Thomas Grub farm. It is a gasser good for 105,000 feet. Four miles south of Chesterhill, Section 25, same township, the East Ohio Gas Co. has a gasser good for 1,168,000 feet on the Sarah, Louise and Elizabeth Engle farm. Five miles west of Chesterhill, Section 25, Marion Township, the Morgan Oil & Gas Co.'s second test on the Nathan Woodyard farm is a gasser good for 213,000 feet.

The Hope Construction & Refining Co.'s test on the Daniel Harnes farm produced 18 bbls. after completed and shot in the Clinton sand.

Athens County

In the village of Caanansville, Section 23, Caanan Township, Athens County, the Bowman Oil & Gas Co. has completed in the Berea grit a test on the C. H. Brown farm. It is a light gasser in the formation named. At Jerseyville, Section 1, Athens Township, Athens County, the Wehrle company has completed in the Berea grit a test on the Charles H. Williams farm. It is a gasser good for 250,000 feet. In the northern part of Lot 287, Sutton Township, Meigs County, the Pure Oil Co. has started to drill another test on the Anthony Salser farm.

Five miles west of Liverpool, Ravenwood district, Jackson County, Edward Hershman and others have completed in the Berea grit a test on the K. C. Hutchinson farm. The location of this test was regarded as permanent. No wells had been previously completed in that section.

West Virginia

The West Virginia and Southwest Pennsylvania fields completed but one large producer. Ritchie County, West Virginia, continues to lead in wells drilling and completed. Greene County leads the Southwest Pennsylvania fields in the number of wells starting and drilling. Fair gassers are the best this county has had to offer for a number of weeks.

Just at the close of the week of development work, West Virginia sprang to the front with a good producer, the best that has been drilled in a great many weeks, and the best since the first of the year. In Reedy district, Roane County, the Heck Oil Co. completed and shot in the Berea grit No. 11 on the J. W. Conley farm. It produced 130 bbls. the first 24 hours. In Grant district, Ritchie County, the Astron Oil Co. completed in the Big Injun sand No. 8 on the Herman Strusburg Realty Co.'s property, good for 10 bbls. a day.

In Jefferson district, Pleasants County, the Sharp Farm Oil Co. has completed a second test on the George Sharp farm. It is a 3-bbl. pumper in the salt sand. In Grant district, Pleasants County, E. C. Hartman completed No. 6 on the Hammett heirs' farm. It is a duster. In the same district, Swingle Brothers are drilling a second test on the Fulton Holdren farm.

On Trace Fork, DeKalb district, Gilmer County, the Hope Construction & Refining Co.'s test on the Catherine Wilt farm is showing less than 1 bbl. a day in the Big Injun sand.

On Lowthers Run, Murphy district, Ritchie County, J. G. Cochran has completed a test on his own farm, a gasser in the Big Injun sand good for 1,000,000 feet.

In Mannington district, Marion County, West Virginia, the South Penn Oil Co. has built a new rig at its No. 8 on the W. O. Faw farm.

W. C. Patterson shot his No. 32 on the Vernon and Donogo farm in the gas sand and increased the production to 1 bbl. per day. It is in Clay district, Wirt County.

On the waters of Indian Creek, Murphy district, Ritchie County, Park Bowser completed his No. 3 on the J. Grimm farm in the Injun sand and has a well good for 1,000,000 feet of gas per day.

The Carnegie Natural Gas Co. has drilled deeper an old gas well on its No. 1 P. N. Logan farm and has a 1-bbl. producer at 2,520 feet in the Gantz sand. It is about 2,000 feet east of its No. 1 Jessie Brown farm on Alum Fork, Freemans Creek district, Lewis County.

In Grant district, Pleasants County, West Virginia, George Pickens and others' No. 2 on the Keister heirs farm has been completed to the Injun sand and will make a producer good for 10 bbls. per day.

On Alley Tract Branch of Breeden Creek, Mingo County, the Public Gas Corp. has located No. 21 on the Henry Closterman estate, 500 feet northwest of No. 17 on the same farm.

In Murphy district, Ritchie County, West Virginia, the Hope Natural Gas Co. has made a location on the Ina Ayers farm. In the same district, Park Bowser is due in the Maxon sand at a test on the J. W. Grim farm. L. C. Huff and others have rig material at a location on the William Hammett farm. In Union district, Wood County, Rothewell & Co. are rigging up at a second test on the John Freshwater heirs' farm.

Gas Companies Wildcatting

In Hackers Creek district, Lewis County, the J. E. Angelin Gas Co. is hauling rig timbers to a location on the S. B. Propost farm. In the same district the Jane Lew Gas Co. is building the road to a location on the E. M. Flening farm. In Cove district, Doddridge County, the Hope Natural Gas Co. is rigging up to drill deeper its test on the Thurman Spurgen farm. In Geary district, Roane County, the Pet Oil Co. is due in the sand on the Bertha Canterbury farm. In Sheridan district, Calhoun County, M. F. Crowley is due in the sand on the J. A. Buck farm. In Sherman district, W. S. Dailey & Son have started to drill a test on the Charles Robinson farm. In Duval district, Lincoln County, the United Fuel Gas Co. is drilling on the Bias farm. In Jefferson district, Pride & Adkins are due in the sand on the E. G. Stone farm. The Foote Oil & Gas Co. has a rig up on the Lon Stowers farm.

Southwestern Pennsylvania

In Darlington Township, Beaver County, Pennsylvania, Mellon & Galey completed No. 2 on the William Carney farm and have a fair gas well.

In East Finley Township, Washington County, the New Oil & Gas Co. has completed in the fourth sand a test on the George Montgomery farm, good for 5 bbls. a day.

JANUARY OPERATIONS IN MEXICO ADD 15,010 BBLS. NEW PRODUCTION

By George Blardone

TAMPICO, Mexico, Feb. 17.—Whether this year of 1928 is going to prove more propitious to oil operators in Mexico, naturally at this early day remains to be seen. Suffice it, however, that January did show to much better advantage, pay completions considered, than did the two doleful months of November and December. January did record new production of 15,010 bbls. from seven pay completions out of a total of 17 wells finished. True, it nearly all came from one well, but at least the month rounded out above the 1,000-bbl. mark.

The well of the month was Penn Mex Fuel Co.'s No. 8 Paso Real, south of its Alamo Pool, in the south fields. The well finished for a conservative estimate of 12,000 bbls. at 2,280 feet. Penn Mex scored a 250-bbl. well in its Jardin, southeast of Alamo, at 2,300 feet. Its No. 29 Alamo was a failure at 2,467 feet. These three completions are the January record for the south fields.

Northern Fields

In the northern fields, Empire Gas & Fuel Co.'s No. 23, Lot 11, West Maguabes, Panuco sector, was the best completion of the month. At 1,620 feet, a shallow depth, it came in good for say 1,500 bbls. The next best well was La Corona Petroleum Co.'s No. 201, in the Cacalilao, which is rated 1,000 bbls. at 1,815 feet. In the old Panuco sector the same company had 110 bbls. in its No. 145. Two other small wells completed the north field list. The north fields' new production totaled 2,760 bbls. This joined with the 12,250 bbls. of Penn Mex Fuel Co.'s south fields completions, sums the total for the month.

There is, at this writing, say only 33 wells actually making hole, or actively preparing so to do. There are perhaps some half-score, or a trifle more, unfinished tests standing, but as nothing has been done on them for some time they are not considered in the above figures. Some of them are too deep for much hope; and others are only a few hundred feet.

South Fields

In the south fields, while there are several scattered tests, the real activity is with Penn Mex Fuel Co. Huasteca Petroleum Co. has stopped field operations there and Mexican Eagle Oil Co. has only two strings active at this time. In the northern fields the most active of the larger companies is La Corona Petroleum Co., which has seven strings going, if one location that is rigged but not yet spudded is counted. Other companies, large or small, drift down from this figure even to as little as only one string—or nothing.

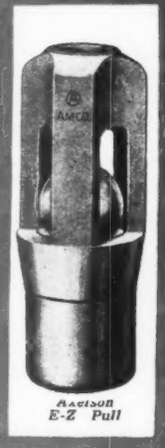
By division, the northern fields have 25 strings in operation or about to spud and in the south fields the figure is eight.

There are, of course, some few wildcats scattered around well out of range of the Tampico-Tuxpam embayment production; and in south Mexico (Isthmus of Tehuantepec, etc.,) Mexican Eagle Oil Co. keeps some tools active there.

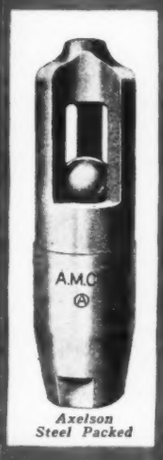
Meanwhile the doldrums continue, with much discussion for the outlook for the remainder of this year, so far as this district is concerned. One large company, during the past week, made another drastic reduction of its operating personnel.

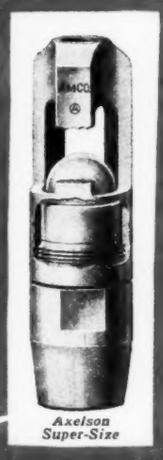
MOTOR OUTPUT INCREASE

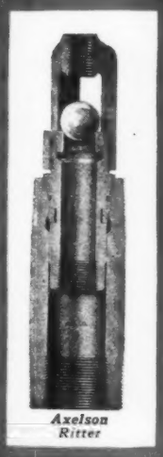
Production of automobiles in January increased 69 per cent over that of December and totaled 221,890 cars, the National Automobile Chamber of Commerce reports. The January, 1928, output was 18 per cent greater than in January last year.

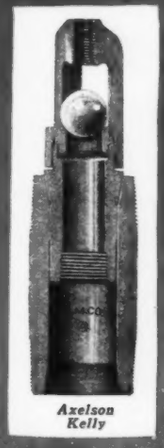

Axelson E-Z Pull

Axelson Babbitt Packed


Axelson Steel Packed


Axelson Super-Size


Axelson Ritter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The E-Z Pull, our latest type, provides Cage and Body in one piece, with no recess between, so that when the Valve is lifted, the tapered surface lifts easily. It seats in action; lifts when pulled. Sand can't freeze it. All steel.

The five other Axelson Standing Valves illustrated are types that are well known in the Field. A request will bring to you new literature.

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Mid-Continent Distributors—Frick-Reid Supply Co.

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MEN KNOWN IN OILDOM

Archie W. Leonard

Archie W. Leonard, vice-president and general manager of the Devonian Oil Company, is one of the best known and best liked personalities in the Mid-Continent oil field.

He is best known through his connection with the Oklahoma Natural Gas Company, whose operations he guided for many years, and his name was synonymous with the expansion of this gas system which now covers a large part of Oklahoma.

Mr. Leonard was born in the oil fields at Turkey City, Pa., on August 5, 1875. His father was connected with the operating end of the industry. Mr. Leonard has been associated with the oil industry since boyhood, starting at the age of 14 as a pumper. From that time, oil and gas, and athletics have been his hobbies.

He was a member of the football squad when he attended Notre Dame College, where he was educated, and he also attained an excellent degree of proficiency with the boxing gloves.

After leaving college, he was a salesman for the National Supply Company at Mars, Pa., and he later became identified with the Devonian Oil Company and was placed in charge of its properties at Sistersville, W. Va. He has been connected with the Devonian interests ever since.

In 1905, Mr. Leonard came to Oklahoma and built the first gas trunk line of consequence in the state. The line ran from Ramona to Muskogee. He was made a director of the Oklahoma Natural Gas Company in 1916, and was placed in charge of its operations in 1922.

In November, 1926, he resigned from the Oklahoma Natural to devote his entire time to the Devonian Oil Company.

PERSONAL PARAGRAPHS

Lewis Inglee of Denver, representing the Johns-Manville Company, was in Casper, Wyo., for a few days.

* * *

E. H. Moore, president of the Independent Oil & Gas Company, was a Fort Worth, Tex., visitor last week.

* * *

George A. Dye, vice-president of the Wilcox Oil & Gas Company, was a Fort Worth, Tex., visitor last week.

* * *

C. E. Sullivan, sales manager of The Foxboro Company, Inc., of Boston, Mass., has returned to his headquarters after a trip through the Mid-Continent fields.

Frank L. Moore, oil producer of Tulsa, Okla., made a business trip to Fort Worth, Tex.

* * *

Paul S. Ache, president of the Reiter-Foster Oil Company, is back in Tulsa after a trip to New York.

* * *

Maurice Newton of Hallgarten & Company has been elected a director of the California Petroleum Corporation.

* * *

D. E. Buchanan, vice president of the Chestnut & Smith Corporation, was a Fort Worth, Tex., visitor last week.

* * *

Jim Morgan, sales manager of the Smith Separator Company of Tulsa, Okla., has completed a trip over the Gulf Coast Fields.

* * *

E. J. Nicklos, division manager of The Texas Company in the Oklahoma-Kansas territory, has returned from a trip to New York.

* * *

W. D. Lundy, president of Advance Oil Company of Calgary, recently underwent a successful operation for appendicitis at Oakland, California.

* * *

George Seaman, well known in supply circles, has joined the Wagner Supply Company of Fort Worth as Fort Worth and Dallas representative.

* * *

Johnny Moran, sales manager of the American Tank Company of Oklahoma City, Okla., spent part of last week in Tulsa calling on the trade.

* * *

William M. Clancy, general manager of the Keystone Composition Company of Williamsport, Pa., is spending a few weeks in the Mid-Continent.

* * *

S. L. Ramage, field superintendent in the Seminole district for the Skelly Oil Company, is at a Tulsa hospital, suffering from appendicitis.

* * *

W. S. Ackerman, chief statistician of the Associated Oil Company, has returned to San Francisco following a hasty business trip to Los Angeles.

* * *

E. H. Courtenay, vice president of the Pipe Bending Process Co., Louisville, Ky., has been calling on the Mid-Continent refining and producing trade.

* * *

T. G. Laney, research engineer for the Fisher Governor Company of Marshalltown, Iowa, is spending a few weeks in the Oklahoma oil fields.

* * *

J. M. Bruns, district manager of Barber-Greene Company, Aurora, Ill., is returning home after a month's trip through the Mid-Continent territory.

* * *

B. M. Nowery of The Palmer Corporation, Shreveport, La., has been spending some time in the West Texas fields on business for the corporation.

* * *

C. W. Moore, formerly sales representative of the International Supply Company at Tulsa, Okla., is now representative in the Mid-Continent Field for the Quaker City Rubber Company, of Philadelphia, Pa.

* * *

Guy Moseley of the White Eagle Oil & Refining Company, with headquarters at Tulsa, Okla., has returned to his desk after a trip through North Texas, and a visit to the company's main office at Wichita, Kans.

* * *

F. B. Gordon, vice president of California Petroleum Corporation, and supervisor of lands and leases, has resigned, effective March 1, to engage in business as an independent operator.

* * *

Charles E. Markey, in charge of the oil fields sales division of the Link Belt Company, of Indianapolis, Ind., is making a trip through the Mid-Continent in the interests of his company.

* * *

E. P. Wilburn of Wewoka, Okla., and R. W. Richmond of Ada, Okla., prominent drilling contractors, are optimistic as to the outlook for this year. They were in Tulsa during the past week in connection with plans for drilling campaigns they will undertake in the near future.

J. H. Greer, general superintendent of production for Kansas and Oklahoma, of the Pure Oil Company, is in a Tulsa hospital, following an operation for appendicitis.

* * *

M. W. Grimm, petroleum geologist of the Tidal Oil Company at Shreveport, La., has arrived at Aberdeen, Miss., and is checking the area in both Alabama and Mississippi.

* * *

Earl Gaylord and Clark Jester of the Standard Oil Company were in Los Angeles for several days during the past week, but have since returned to the home office in San Francisco.

* * *

F. L. Carmichael of Tulsa, Mid-Continent representative of the Central Tube Company of Pittsburgh, Pa., is spending 10 days in Texas calling on the trade and their distributors.

* * *

S. R. Shoup, general sales manager of the Joseph Reid Gas Engine Company of Oil City, Pa., has returned to Los Angeles, having concluded the business which brought him to Oil City.

* * *

D. W. Lewis, who spent the past six months on leave of absence in California, has resumed his duties as field superintendent for the Midwest Refining Company at Salt Creek, Wyo.

* * *

M. J. Grogan, vice president, and C. R. Harrison, secretary, of the Louisiana Oil Refining Corporation, have returned to Shreveport, La., from a two weeks' trip to New York offices of the company.

* * *

A. H. Hand was recently appointed auditor of general accounts of the Union Oil Company at Los Angeles, succeeding H. H. Hannah, who resigned to become auditor of the Atlantic Union Oil Company.

* * *

George H. Parker, branch manager at Bristow, Okla., for the Parkersburg Rig & Reel Company, has been transferred to Winfield, Kans., where he will be manager of the Oxford branch of the Parkersburg company.

* * *

G. H. Jaques, assistant general superintendent of production of the Midwest Refining Company, and F. D. Wood, petroleum engineer for that company, are on an inspection trip of company properties in Kansas, New Mexico and Utah.

* * *

J. D. Thomas, representing the Mid-Northern Oil Company, a subsidiary of the Midwest Montana Refining Company, was called to Billings recently by the serious illness of his small daughter, who, with her mother, is visiting friends there.

* * *

W. M. Maddox, assistant traffic manager for the Magnolia Petroleum Company of Dallas, presided at the quarterly meeting of the Southwest Shippers Advisory Board held in Shreveport, and also made the report, as chairman, of the committee on petroleum and petroleum products.

* * *

While M. E. Wilson, manager of the production division of the Louisiana Oil Refining Corporation in Shreveport, La., is making temporary headquarters at Allen, Okla., where the corporation is developing its properties, his place is being filled by Lawrence Saunders, his chief clerk.

* * *

Prof. Hugh S. Taylor will receive the Nicholas medal for 1928, awarded by the New York section of the American Chemical Society, on March 9, when he will deliver an address on "Catalysis as an Inspiration of Fundamental Research" at Rumford Hall, New York. Professor Taylor is chairman of the Central Petroleum Committee of the National Research Council.

* * *

Members of the manufacturing committee of the Cities Service oil properties have been visiting the company's facilities in the Mid-Continent and have held several meetings in Tulsa during the last week. Included in the committee are W. W. Lowe, D. G. Brandt, R. A. Wotowich and Henry Lyons of New York City, L. M. Bound and Jack Griswold of Boston and C. E. Burch and M. Straight of Philadelphia. The party left Saturday on their way home.

The Longest String of 15½-in. Casing Ever Set in Wyoming

Wertz Dome.—No. 8 sec. 7-26-90; waiting for cement to set on string of 15½-in. casing at 2291 ft. This is the longest string of 15½-in. casing ever set in Wyoming.

(REPRINTED FROM INLAND OIL INDEX, ISSUE OF OCTOBER 14, 1927)

Run With the Butler Slip Ring Elevator

(PATENTS PENDING)

The fact set forth in the clipping reproduced above, from the *Inland Oil Index, Oct. 14,* is of more convincing importance than any comment on our part could possibly be—that when the *supreme test came,* a *Butler Slip Ring Elevator* was selected to handle it.

Further, we have the word of Mr. Floyd Hatfield, superintendent at Wertz Dome, that this immense weight was handled with maximum speed and satisfaction, and without mishap.

Great strength, the development of tremendous gripping power, and the attainment of high speed performance are chief among the distinguishing characteristics of the all-steel *Butler Elevator.*

Instead of lifting the casing by the top coupling, the *Butler* has movable slips which work within a heavy steel bowl, thus engaging the casing and carrying the entire load. All slips are extra long, of correct taper, interlocking and self-aligning. They engage the outside wall of any make of casing without danger of slipping or crushing, and are easily released.

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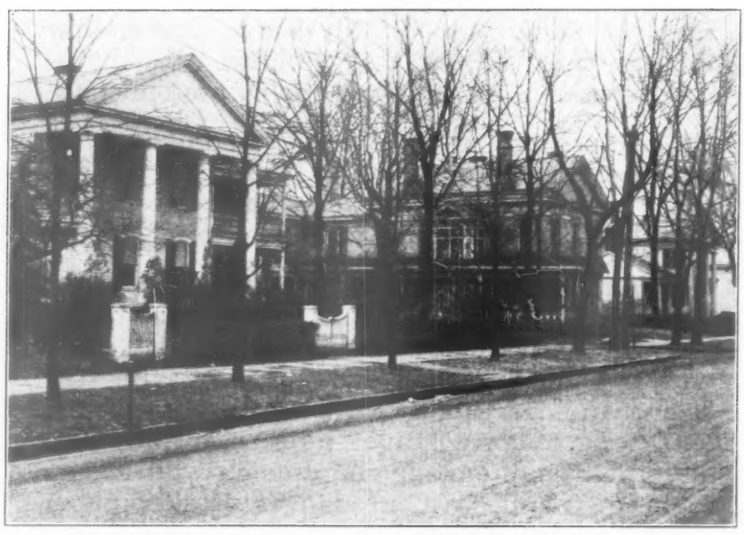
WORLD'S OLDEST AND LARGEST MANUFACTURERS OF OIL FIELD EQUIPMENT

Mount Vernon in Virginia—

enshrined in the heart of the Nation as the home of George Washington

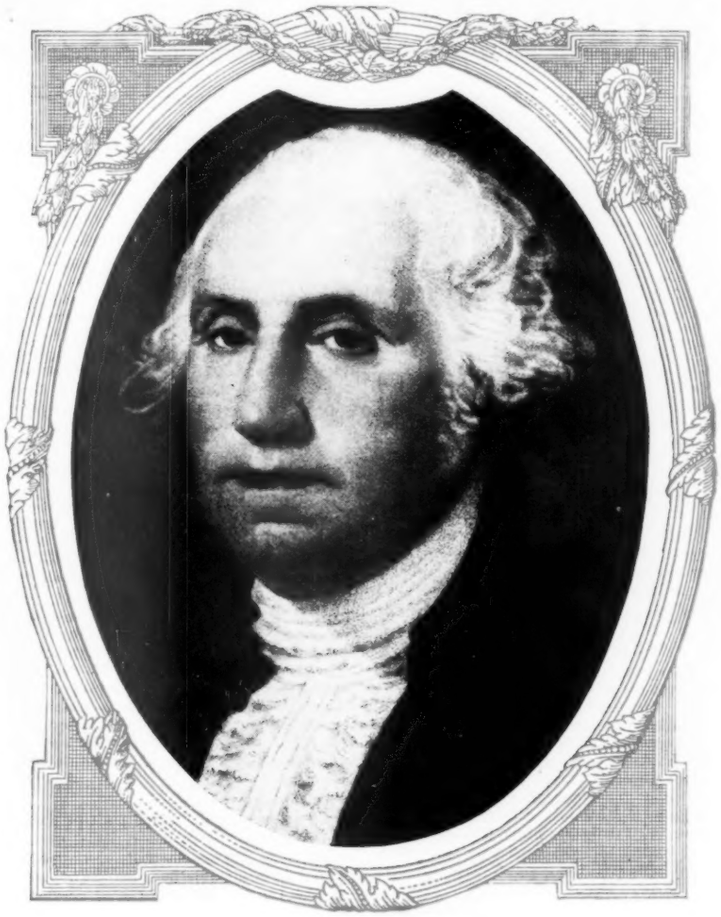
Mount Vernon, home and burial place of George Washington, situated in Virginia on the Potomac River, 15 miles below Washington City. The house is 96 feet long. It was named in honor of Admiral Vernon, under whom Lawrence Washington had served in the West Indies. The library and Washington's bedroom are kept as they were when used by him.

Some typical colonial homes in Mt. Vernon, Ohio, a beautiful little city thickly set with elm and maple trees and very near the center of the state. It is 45 miles northeast of Columbus on the "three C" and Pikes Peak highways. It was named after George Washington's home in Virginia and has been the home of Cooper products for ninety-five years —very nearly a century.



Known throughout the gas and oil producing industries as the home of Cooper Engines

Mount Vernon in Ohio



Of Washington, Patrick Henry said in the Virginia legislature:—"For solid information and sound judgment, the greatest man in the assembly." Later, as commander-in-chief of the Continental Army his courage, prudence, firmness and perseverance never failed under baptism of hardships such as no other American soldier and statesman ever endured.

Once again we take this opportunity to refresh our memories and confess our admiration for "the father of our country."

One hundred and ninety-six years ago George Washington was born in Virginia. Ninety-five years ago the first Cooper castings were made in Ohio.

Our city, named after Washington's home, is a constant reminder to the men and women who live here that the same personal qualities are still to be desired. In our experience, the men who build Cooper Engines and Compressors have always been dependable, loyal to their country, their friends, their company and themselves. Perhaps the name of our city helps those who live here to be better Americans just as the name Cooper *inspires* a wide-spread confidence in, and respect for, the engines bearing this name.

The C. & G. Cooper Company

Tulsa, Dallas, Mt. Vernon, Ohio, Los Angeles

EQUIPMENT AND SUPPLIES

DERRICK FOR TROPICS RESEMBLES A PAGODA

The accompanying picture of an International Ideco galvanized steel derrick in the Samboja Field near Balikapapan, Borneo, D. E. I., shows an interesting method used to protect the drilling crews from the intense heat, sunshine and the heavy tropical rains. Owing to the heat and humidity, completely enclosing the derricks was out of the question, so the production engineers devised these series of canopies which give the derrick somewhat the appearance of a pagoda. A roof covers the crow's nest and the canopies are made with an overhang wide enough to shade completely the interior of the derricks during the heat of the day and to protect the workmen from rains.

The heavy rainfall, fertile soil and the tropical climate cause creepers, vines and other vegetation to grow so rapidly

that it is a continual fight to keep the roads and clearings open. Rust and corrosion are also a constant menace. In the hot moist climate rust forms rapidly. Ideco galvanized derricks, machinery supports, steel wheels and standard steel buildings are widely used under such conditions. Ideco derricks and other products are hot-dip galvanized after fabrication. This eliminates any possibility of unprotected surfaces being exposed to the weather. The derrick shown is one of several standard Ideco drilling derricks used in this field and is identical with the Ideco derricks used in the Mid-Continent, California and South American oil fields. They are built by the International Derrick & Equipment Co., Columbus, Ohio, and Torrance, Calif.

JIM REGAN SEEKING HEALTH

Owing to a general breakdown Jim Regan has withdrawn temporarily from active service in the Regan Forge & Engineering Co. and the Regan Sales Co., San Pedro, Calif. Mr. Regan expects to devote at least six months to an effort to regain his health. During his leave of absence granted by the directors of the company he will perform no business duties whatever. He plans to pass much of his enforced vacation at a curative springs.

TRADE LITERATURE RECEIVED

A 20-page bulletin, with colored illustrations, issued by the Wellman-Seaver-Morgan Co., Cleveland, Ohio, is devoted to the Wellman Supertest gate and globe valves.

"Pumping Problems I Have Met" is among the articles in the latest issue of Inco, published by the International Nickel Co., New York.

DISTRICT MANAGERS MEET

The twenty-sixth annual meeting of the Pittsburgh Equitable Meter Co. district managers closed with a banquet attended by the heads of the production departments and of the office and sales departments. It lasted four days. Improvements in design and construction, as well as development of several new products in both the gas and water divisions, resulted in interesting discussions.

Bringing the district managers in for such meetings enables them to come in direct contact with the employes actually engaged in the manufacture of the company's products. This contact with the factory enables the salesmen to handle problems submitted to them by the trade.

WESTINGHOUSE PROMOTION

D. F. Miner has been appointed manager of the material and process engineering department of the Westinghouse Electric & Manufacturing Co.

In the war Mr. Miner was a captain with the First Howitzer Regiment, Fifty-first Artillery.

Soon after the war, Mr. Miner entered the employ of the Westinghouse company as a section engineer in the material and process engineering department. He conducted many interesting experiments. He built apparatus for producing the most powerful stroke of lightning that was ever under control. This single bolt of lightning dissipated 10,000,000 horsepower at 1,000,000 volts. The 1,000,000-volt equipment was used also to produce a 55-foot arc, the longest arc produced in the laboratory.

RESULT OF ENGINEERING TESTS

Webers 48, an insulating cement manufactured by the Insulating Products Co., Chicago, is described as "an achievement in insulation" in a folder issued by the manufacturer. The material, said to have been perfected through intensive experiments and innumerable engineering tests, is especially designed for insulating water furnace water walls, economizers, superheaters, preheaters, air ducts and other links in the steam cycle, while suitable for application on all types of equipment.

SMALL COOLING TOWER PLACED ON THE MARKET

The Power Plant Equipment Co., Kansas City, Mo., has placed on the market a small unit type of the Marley Spray Cooling Tower, adapted to oil engine, ice plant and similar installations where small quantities of water must be cooled continuously. It combines the features of the spray pond and the standard cooling tower designs. The Marley tower occupies a space 8 by 8 feet and is only 9 feet high, but the manufacturers say it thoroughly cools any quantity of water up to 100 gallons a minute.

ATLANTA BRANCH ESTABLISHED

The Wagner Electric Corp. of St. Louis announces the opening of a new branch sales office in Atlanta, Ga., to cover Georgia, Alabama and Florida, until recently a part of the St. Louis sales territory.

Roy F. Druschky, until recently a salesman in the St. Louis territory, has been put in charge of the Atlanta office. This is his sixteenth year with the Wagner Electric Corp. The opening of the Atlanta branch office makes possible a closer contact between the Wagner company and its motor, transformer and fan customers in Alabama, Georgia and Florida.

STARTER HAS NEW FEATURES

A new automatic induction starter with two adjustable features is announced by the Lincoln Electric Co. of Cleveland. One of the adjustments is in the starting current and starting torque and is made by changing the position of the rotor in the regulator. This rotor is index mounted and the starting torque and starting current of the motor are increased by going to the higher numbers of the scale and decreased by going to the lower.

The other adjustment is in the current at which the throwover takes place. The throwover is controlled by a retarding solenoid which is operated by the motor current. The pull of this solenoid can be adjusted by a simple lock rod arrangement carried on its plunger.

FIRE PUMP DESIGNED FOR INDUSTRIAL USE

Goulds Pumps, Inc., of Seneca Falls, N. Y., have brought out a rotary pumping outfit consisting of a gear-type rotary pump close coupled by means of a pin-and-buffer flexible coupling to a gasoline power unit. The pump and engine are mounted on a four-wheel trailer having rubber tires and springs, front and rear. The pump is equipped with relief valve and discharge gate valve which may be threaded to suit various hose coupling threads. The suction is fitted for 4-inch suction hose which can be furnished by the purchaser or the manufacturer.

The pump has an iron case and bronze cams. Ball bearings are used throughout. The cams are piloted at either end of the pump with steel pilot gears cut from the solid. The pump is bolted and doweled to the power unit frame by means of an open adapter casting which allows perfect access to the flexible coupling.

The engine is a standard self-contained, enclosed, industrial power unit with all accessories, ready to run as soon as fuel, oil and water are added.

The trailer chassis is a steel frame fitted with springs both front and rear. The wheels are fitted with roller bearings of the completely enclosed type and the tires are of hard rubber.

The outfit will throw a standard 250 GPM fire stream through 1⅛-inch standard hose nozzle with a pressure of 100 pounds per square inch at the pump using 100 feet of 2½-inch hose.

This new unit has been designed for the use of small villages or communities and for industrial plants having no regular fire protection. In addition to fire service the unit is suitable for pumping out cellars or for any general emergency pumping service.

FOWKS ON EXTENDED TOUR

Starting from Los Angeles, Calif., E. B. Fowks, of the Emsco Derrick & Equipment Co., has begun a 6-month trip which will cover most of the important oil fields of Central and South America, including Argentina, Chile, Peru, Ecuador, Colombia, Venezuela and Trinidad. Upon his return Mr. Fowks will begin preparations for a second trip which will take him to Persia, Rumania, Egypt, Russia, India, Java, Borneo and Sumatra. Mr. Fowks, of American descent, was born in Peru, educated in the University of Southern California and has been in the petroleum industry 15 years, 4 of these with the Emsco company.

E. B. Fowks

NEW ROTARY ADDED TO LINE

The latest addition to the "Oilwell" line of Make-and-Break Rotaries is the "Oilwell" 26-inch Imperial, which is recommended for drilling to any depth. In this rotary the base proper and the skids are made in one piece, the gears and pinion are forged steel with cut teeth, and the pinion shaft is equipped with Timken roller bearings.

It is constructed so as to permit a 30-inch fish-tail bit to be lowered through or pulled out, and has a full diametrical opening of 26 inches. Passage through the rotary for 26-inch to 30-inch fish-tail bits is provided by two slots in the rotary table, located opposite each other. The Imperial rotary is made by the Oil Well Supply Co., Pittsburgh, Pa.

MACHINE LAYS 4-INCH PIPE

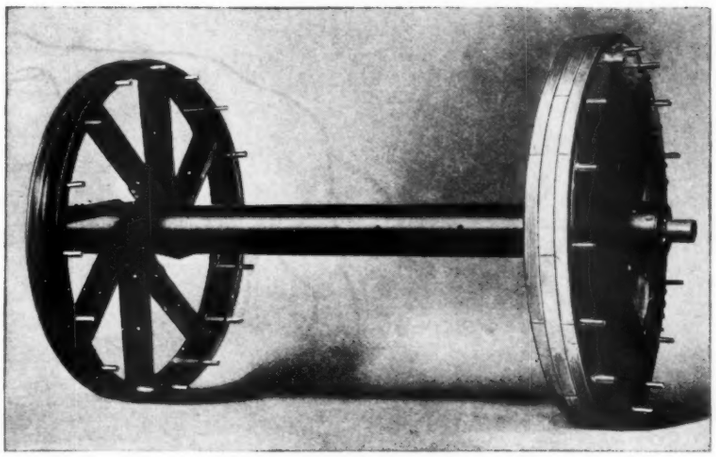
The "Mahoney" machine for laying 4-inch to 6-inch pipe has been added to the models manufactured by the California Pipe Line Machine Co. According to the makers it weighs less than 1,000 pounds and will lay 4-inch pipe as well as it lays 6-inch. It can be loaded on a small truck. Eight to ten men only are required on the crew, and the machine is said to be capable of laying a mile of pipe a day. It is operated on the same principle as the larger machines.

OPEN HOUSTON OFFICE

The Wailes Dove-Hermiston Corp., manufacturer of Bitumastic and Hermastic, protective coatings, has opened an office and warehouse at 701 North San Jacinto Street, Houston, Tex., with I. A. Pfeil as manager.

MOORE PUMPING BULL WHEEL

A New Light Type BULL WHEEL



SPECIFICATIONS

7′ 6″ diameter. Steel shaft, 13″ @ 48.73 lbs., heated and shrunk on the gudgeons and securely riveted in place. Gudgeons 13′6″ shoulder to shoulder. Trunnions 5″ diameter x 6″. 8-spoke wheels with 9″ brake face and rolled steel, double V groove tug rim. Hickory hand pins. Moore wing plate construction with tangent spokes, exerting direct push on the shaft. Corners of spokes are trimmed for easy assembly.

World Wide Service for Twenty Years

AN economical steel bull wheel for shallow drilling, cleaning out and pumping service. Being lower in price than the standard wheel, the Moore Steel Pumping Bull Wheel reduces the investment in rig equipment over a producing well.

After drilling is completed, the standard wheel may be replaced with this light type wheel. It is not necessary to change the bull wheel posts as the shaft is the same length and has the same size trunnions as the standard wheel.

LEE C. MOORE & CO., *Inc.* PITTSBURGH · TULSA

Established 1907

DALLAS, TEXAS HOUSTON, TEXAS WICHITA FALLS, TEXAS BORGER, TEXAS PARKERSBURG, W. VA.
CASPER, WYO. SHREVEPORT, LA. EL DORADO, KAN. EL DORADO, ARK.

"GOODALL SM

Lone Oil

G. S. M. ROTARY HOSE

demonstrates exceptional stamina in hard usage. Also furnished in extra heavy Combination Rotary and Cementing Hose.

G. S. M. MANIFOLD HOSE

Designed to provide a flexible connection between standpipe and pumps, thus eliminating strain on the pumps, vibration and noise, and preventing derrick from taking up too much swaying motion.

For that extra margin of safety and uninterrupted service, specify

"BOSS DUPLEX" COUPLINGS

illustrated above.
Heartily recommended for all types of Rotary Hose.

"If CONTINE

there isn

SEMI-METALLIC"

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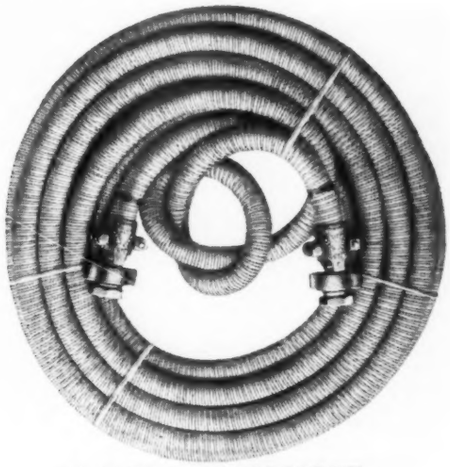
il Industry
Hose



G. S. M. STEAM HOSE

Strength, durability and flexibility render this type eminently practical and economical for all steam uses. Sizes ½" to 2½" in lengths up to 50 feet.

"GOODALL Semi-Metallic" Hose has won leadership in the Oil Industry because it is not only brutally strong and exceptionally flexible, but—like the elephant among animals—it is notably long-lived.

The G. S. M. inner tube of highest grade rubber resists wear from sand and other abrasives. The flexible, ball-joint armor withstands highest pumping pressures and defies outside wear and damage. Rotary and Special Manifold Hose are spot-welded every 30 inches, and armor is welded to coupling, insuring additional strength and safety.

G. S. M. is furnished in Rotary Hose, extra heavy Combination Rotary and Cementing Hose, Manifold Hose and Steam and Water Hose. Also special types.

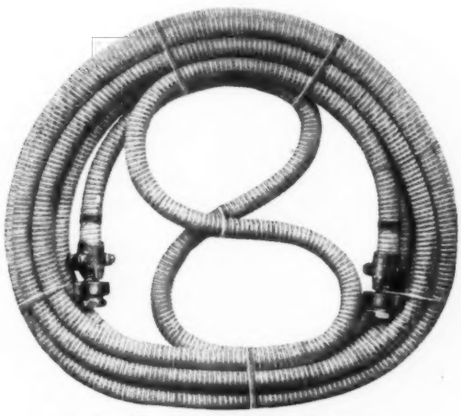
THE CONTINENTAL SUPPLY COMPANY

General Offices: St. Louis, Mo.

Export Office: 74 Trinity Court, New York

London Office: 316-317 Dashwood House, Old Broad St., E. C. 2

THE CONTINENTAL SUPPLY COMPANY, Ltd.
69 Thomas Block, Calgary, Alberta, Canada



G. S. M. WATER HOSE

Wherever water hose must resist extreme external wear and high internal pressure, G. S. M. gives dependable and long service. Sizes ¾" to 3", in lengths to 50 feet.

ENTAL sells it
s no better"

Field Problems and Their Solution

EDITED BY THOMAS F. SMILEY

In order that men connected with the drilling, producing and transporting branches of the petroleum industry may procure quickly a solution of many problems confronting them from time to time in their work, The Oil and Gas Journal has arranged with leading engineers and other recognized authorities to answer questions submitted by readers of this publication pertaining to the work of drilling and producing crude oil and transporting this product.

Everyone is invited to submit questions freely. These questions will be submitted to proper authorities by Mr. Smiley, who edits the page, and answers, based on the best available information, will be published. Each question should give as much detail as possible, especially where it relates to matters where depths of sands, types of sands and operations on adjoining properties would have a bearing on the problem involved. The source of all questions will be considered as confidential and only initials will be published in connection with the question.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or practices which are improvements.

In case an immediate answer is important, one will be given by mail if the writer requests it.

EMULSIONS FORMED BY GAS LIFT

It has come to my attention that the use of the gas lift results in the forming of emulsions that are hard to break down. Is it possible to determine beforehand if emulsions hard to treat will be formed?—P. H. S.

The use of the gas lift in certain parts of the country has resulted in the forming of very refractory emulsions. Where this has occurred, the gas lift method of production has been discontinued and the wells were placed on the pump. The formation of this type of emulsion has been largely confined to California, Gulf Coast and certain of the Rocky Mountain fields. They are generally confined to the asphaltic base oils and to a lesser extent to the mixed base oils. Little difficulty has been experienced in the Seminole area in Oklahoma and in many other of the Oklahoma fields. If emulsions are readily formed during pumping operations and if difficulty is experienced in breaking these down, it is almost certain that the use of the gas lift will increase your difficulties.

ORIGIN OF SLUDGE EXPLAINED

A sort of sludge forms in the crankcase of my gasoline engines at times, giving me more or less trouble. I don't understand how this can form for there seems to be water in it, and yet there has not been any chance for the water to get in. How do you explain this condition?—A. C. W.

Steam condenses in the combustion chamber, and the minute drops of water under the action of the piston are beaten up with the oil film on the cylinder walls. As this film is being continually resupplied from the crankcase, the water-laden oil is transferred to the crankcase, there to be whipped up with the oil supply by the action of the connecting rods.

DETERMINING DEPRECIATION

I have been trying to hit on some reasonable basis for figuring the depreciation of drilling tools and other oil-well equipment. One difficulty lies in the fact that the depth of holes and the nature of the formations have a lot to do with the length of time drilling tools last. Can you tell me whether any sort of rule has been established in this matter?—F. H. W.

The difficulties which you yourself point out make it almost impossible to offer any fixed rule for fixing depreciation allowance on drilling tools. It would seem necessary to know the circumstances in any given case before determining a reasonable percentage for depreciation. The Board of Tax Appeals in Washington, D. C., has made rulings in such cases after certain data had been obtained or has made them arbitrarily when desired records were not available.

In the case of an appeal to the board by E. B. Miller, of Tulsa, Okla., the commissioner of internal revenue had allowed $1,929.72 for depreciation. Miller asked for an allowance of $2,588.51. After pointing out that the appelant had not kept any record to show the useful life of tools, the board's decision says:

"The useful life of the various tools varied greatly in length in different territory, depending upon the character of the earth strata and the depth of the holes. Under some conditions a string of tools would last not more than two years. Under other conditions they could be used from five to seven years. It also happened occasionally that tools would break or be lost in a hole while comparatively new. During 1919 the partnerships operated in the Drumright Field, where deep drilling was done, and experience showed the average life of tools in that region was about four years. We find a reasonable rate for depreciation in 1919 is 25 per cent."

In the case of the Gilconda Oil Co., of Wichita Falls, Tex., which appealed from the depreciation allowance fixed by the internal revenue commissioner, the United States Board of Tax Appeals held that depreciation of oil-well equipment allowed on a unit of production basis, rather than a straight line basis, as useful life and value, depended upon the rate of extraction of oil content. The internal revenue commissioner had allowed depreciation at the rate of 25 per cent a year for seven months, in the amount of $2,792.53. The oil company contended that the depreciation to which it was entitled should have been arrived at by dividing the estimated oil reserves recoverable from the well in question during the life of any particular piece of equipment into the investment for such equipment at the close of the year 1919 and multiplying the unit thus obtained by the number of barrels of oil obtained from that well in the year 1919. If calculated on that basis the allowance for depreciation would have been $7,900.35.

The equipment in this case consisted of casing in the well, pipe, tank, engine, rods, etc., such as ordinarily are used in producing from a well about 1,600 feet deep. The life of no part of the equipment, the board said, was longer than the life of the oil deposit from which the oil was produced. The well, like all other wells in the Wichita Falls region, the board pointed out, after having been fully completed and started to producing, would decline gradually in daily output to a point at which it no longer would be profitable to operate it, and then it would be abandoned. An expert would have fixed its probable profitable life at 6 to 10 years. Salvage sales of equipment then would be negligible. Such a well, the board's decision declared, would produce one-half of its probable ultimate output within one or two years after completion.

In giving the opinion of the board Judge Milliken stated: "We are of the opinion that a reasonable allowance is measured by a depreciation of the equipment at the same rate as that at which the oil was depleted in the year, which results in an allowance of $7,900.35, pursuant to the facts stipulated."

BENEFITS OF HOT-WATER WASH

Why does running dirty oil through a hot-water wash tank help in the separation of the oil, water and b.s.? How should such a tank be hooked up?—F. C. B.

The mixture of oil, water and b.s. is heated and the viscosity of the oil is lowered. As the mixture is introduced at the bottom of the tank, the oil in rising to the top expands and the water particles become detached and remain behind. The oil is drawn off at the top of the tank.

The size of tank depends on the required capacity, a tank 10 feet in diameter and 20 feet high can handle at least 500 bbls. a day, the output of course depending upon the type of oil treated. A quantity of water is used sufficient to stand approximately half way up the tank, which is placed vertically. A steam coil is placed in the tank and should be of sufficient length to give the proper heat radiation. The coil should be submerged in the water. About 500 feet of 2-inch will give the desired radiation. The oil, water and b.s. are conducted into a number of pipes arranged horizontally at the bottom of the tank. A number of small holes, usually one-eighth inch are drilled into these pipes, thus permitting the oil to be uniformly distributed. The temperature required to render the operation successful must be determined by actual field tests.

PAINTING THE OIL-WELL BOILER

How often should an oil-well boiler be painted when it is being used right along? Is it wise to use any of the compounds advertised for protecting the inside of boilers?—H. J. D.

You will not be making a mistake if you paint a boiler every 30 days. Oil-field experience indicates that the lengthened service pays for the paint and time. Compounds advertised for the protection of the interior of boilers are used to advantage. According to oil men who have used them they help to prevent mud and sediment from scaling the inside, with resulting damage and perhaps burning of the boiler.

DEFECTIVE GATE-VALVE

A pipe line gate on oil line has been standing open for some time with oil running through it. When it is desired to close the gate, considerable difficulty is experienced in getting a complete shut-off. How can this be remedied?—U. V. H.

That is a rather difficult question to answer without more information. If the gate-valve is located in a low place, it is possible that sediment is deposited in the valve thus preventing the closing of the gate. Often moisture in the line results in rusting of a valve, and the parts will not function properly. About the only way in which the latter condition may be remedied would be to replace the valve.

RELATION BETWEEN EVAPORATION LOSS AND GRAVITY LOSS

Have any experiments been made to determine whether there is any definite relationship between evaporation losses and loss in the gravity of a crude?—B. G. O.

J. H. Wiggins in United States Bureau of Mines Technical Paper No. 319, entitled "Methods of Decreasing Evaporation Losses of Petroleum" has derived a formula for calculating the evaporation loss based on a loss in gravity. In the formula given it is stated that specific gravity must be used:

$$X \text{ equals } \frac{d_2 - d_1}{d_2 - d_3} \text{ where}$$

X equals fraction or the original volume which has evaporated,

d_1 equals specific gravity of crude before evaporation.

d_2 equals specific gravity of crude after evaporation.

d_3 equals specific gravity of fraction evaporated.

To use this formula, convert the A.P.I or Baume gravity to specific and apply in the formula. The difference between the calculated loss as determined by the formula and the one as determined in the field has been found to be virtually the same.

Thus it is evident that there is a direct relationship between the evaporation loss and gravity loss of a crude oil.

OIL CIRCULATION PREFERABLE

Oil is often circulated to free casing that cannot be pulled otherwise. Why isn't it just as good to circulate water? —J. R. L.

Water has a tendency to pack sand; also the carrying power of water is less than that of oil. The oil will take up more of the sand, or other formation that is holding the casing. Oil seems to reduce the plasticity or stickiness of the material that is holding the casing and acts as a lubricator. Circulating with oil to free the casing has met with success in some of the California fields.

SALVAGING BAROID

We have used considerable Baroid for adding weight to the drilling mud. Is there any practical and economical method that may be used to recover the Baroid from the mud in order to use it at some other drilling well?—O. T. N.

About the only practical method we have any knowledge of is to allow the Baroid to settle out of the mud. It will settle out if given sufficient time. The use of chemicals for accomplishing this purpose has been suggested but it is not unlikely that the cost of chemicals would offset any saving that could be effected by salvaging the Baroid.

GAS LIFT IN WEST TEXAS

Is the gas lift being used to any extent in the West Texas Fields?—D. G. L.

The gas lift has not been used to great extent in the fields referred to. Some wells in which it was tried have been taken off the gas lift and are being pumped. As the gas produced is corrosive it cannot be recycled without damage to equipment. The use of air in lifting the oil tends to increase the corrosive action on the tubing and casing, hence unless the corrosion problem can be solved, it is rather doubtful if the gas lift will ever be extensively used in the high sulphur areas.

INTRODUCING

Oxweld C-14 cutting blowpipe

IF YOU are perfectly satisfied with your cutting blowpipes, don't ask to have the C-14 demonstrated.

Because—

Every time this new member of the Oxweld family is demonstrated, it makes a convert.

It has all the inherent advantages of the Oxweld injector type blowpipe.

It can be used with either low or medium pressure acetylene. And you can't make it back-fire.

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STOCKS IN 41 CITIES

IN CANADA, Dominion Oxygen Company, Ltd., Toronto

Oxweld

WELDING AND CUTTING APPARATUS

Natural Gas Developments

MILD WINTER AFFECTS GAS COMPANY SALES

Net income of Columbia Gas & Electric Corp. and subsidiaries for year ended December 31, 1927, was $23,212,762 after taxes, interest, depreciation, depletion and subsidiary preferred dividends, comparing with $26,470,906 in 1926.

In a letter to stockholders, Phillip G. Gossler, president, said in part:

"In comparison with the previous year, there is a noticeable decrease in net income resulting principally from a decrease in the item 'other income' and an increase in the ratio of operating expenses to gross earnings.

"In 1926 there were large holdings of Federal, state and municipal bonds in the treasury, income from which was credited to 'other income.' Late in that year, and in 1927, these were sold to provide funds for new construction and for other corporate purposes, in lieu of issuing additional Columbia securities. The effect was to reduce the income from this source, but the full benefit from the expenditure of these funds has not yet been realized. Also during 1926 the amount of interest during construction charged to capital and credited to this account was unusually large, due to the construction of Columbia power stations and other major additions.

"Certain elements of operating expenses, particularly in the natural gas, gasoline and oil business, which could be materially curtailed in the event of a permanent decrease in the volume of the business cannot with conservative operation be reduced proportionately with a temporary falling off in gross earnings.

"The number of customers directly connected to the system, both electric and gas, has increased steadily each month during the year without taking into account the increase due to acquisition of additional properties. Thus, under corresponding weather conditions the size of the business is larger than ever before. However, particularly during the first five months and last two months of 1927, normally the colder months in which consumption is largest, prevailing temperatures in the territory served have been materially higher than in the preceding year, as both last winter and the current season are among the warmest and most open winters recorded in many years. Consequently the volume of natural gas sold during these months has been materially less than during the same period of 1926.

"The reduced sales of gas required curtailment of production in the field, which was accomplished by holding back our own production while continuing the volume of gas purchased in the field from independent producers. This policy has conserved for the future the gas owned by Columbia system although at the same time largely increasing the gas department operating expenses for the current year to an extent out of proportion to the revenue from gas sales. This relative increase in the amount of gas purchased is the major item of the increase in operating expenses for the whole system."

GREAT FALLS GAS RATE

GREAT FALLS, Mont., Feb. 18.—The city of Great Falls, Mont., is making an effort to have the rate on natural gas reduced. A conference was held between the city officials and the Great Falls Gas Co. but the result was merely shifting the inquiry to the Hope Engineering Co. instead of the Great Falls Gas Co. as it was shown at the conference that the Great Falls Gas Co. purchased the gas at the city limits from the Hope company. The Great Falls Gas Co.'s officials stated that the cost of the gas at the city limits was a bar to any drop in price by the Great Falls Gas Co. The Hope Engineering & Supply Co. has asked permission to extend its gas line at Great Falls to the plant of the Anaconda Copper Mining Co.

GAS SUPPLY CONSERVED FOR DOMESTIC USES

LOS ANGELES, Calif., Feb. 18.—In order that the natural gas being served to domestic consumers in southern California may be maintained at the highest heating value and pressure possible, the gas being served to industrial consumers has been withdrawn to supply the needs of householders on numerous occasions during the recent cold weather, according to a statement issued by State Gas Administrator Brown.

By order of the State Railroad Commission the gas companies of southern California now are being operated under the supervision of Mr. Brown, who has full charge of the supply, allocation and distribution of all natural gas in this territory.

In his statement Mr. Brown points out that on several occasions this winter as much as 30,000,000 feet of gas a day has been diverted by his order from industrial to domestic consumers. On these occasions the industrial consumers continued their operations by using their stand-by oil equipment. They were willing to do so and allow the natural gas to be diverted to homes because in consideration of this practice and other features of their contracts they receive a low rate.

BUTTONWILLOW FIELD GAS FOR SAN FRANCISCO

NEW YORK, Feb. 18.—Commercial development of the Buttonwillow, Calif., gas field depends on the outcome of further exploitation. The Milham Exploration Co., subsidiary of the Mexican Seaboard Oil Co., which is developing the district, has received verbal assurance from a large California public utility company that in the event of the development of a settled gas production of 100,000,000 feet a day, this concern will join Mexican Seaboard in the formation of a company to pipe the gas to San Francisco.

At present Milham Exploration has two producing wells in the Buttonwillow district yielding 14,000,000 feet a day each which is regarded as settled production. This is dry gas and is of different quality than that produced in nearby fields. A third well is now drilling at approximately 1,500 feet.

The Marland Oil Co. has made an agreement with Milham to drill a joint wildcat well 8 miles south of the Buttonwillow Field.

The investment required to construct a gas line to San Francisco is estimated at $7,000,000 or $8,000,000

MUSKOGEE INDUSTRIAL RATE

MUSKOGEE, Okla., Feb. 18.—Lower industrial gas rates for consumers outside of Muskogee city limits will be put into effect in the immediate future by the Oklahoma Natural Gas Co., it was announced by W. K. Winton, chairman of the gas committee of the Muskogee Real Estate Board. The reduction is to be a rate of 35 cents per 1,000 feet for the first 100,000, with a flat rate of 15 cents per 1,000 for all additional consumed, where consumers use a minimum of 15,000,000 feet per month. The Sinclair and the Pure Oil refineries and the Southern Ice & Utilities Co. are the only concerns that consume gas in sufficient quantities to profit by the reduction.

INQUIRIES FOR PIPE FOR NEW K. C. LINE

PITTSBURGH, Pa., Feb. 18. — Pipe mills have received inquiries for 400 miles of 20, 22 and 24-inch line pipe for a gas line from Amarillo, Tex., to Kansas City, Mo., involving say 100,000 tons.

As the Empire line from Amarillo to Kansas City is practically completed it is understood the new line is that contemplated by the Knorpp interests as announced last fall when John L. Knorpp, president of the Southwest Gas & Development Co., applied for an industrial gas franchise in Kansas City which was later granted under the name of the Citizens Industrial Gas Co. The Knorpp Pipe Line Co. was stated to have in view the construction of a gas line from Amarillo to Kansas City with a capacity of 150,000,000 feet, and costing around $30,000,000. The Citizens company franchise is for 30 years with an industrial gas rate of 25 cents. Day & Zimmerman were reported making surveys last fall and the financing of the project was said to be under construction by Peabody, Houteling & Co and Hemphill, Noyes & Co.

NEW ORLEANS GAS FRANCHISE

SHREVEPORT, La., Feb. 18.—Whoever is seeking a franchise from New Orleans to supply gas to industrial and domestic consumers, which no one here seems to know definitely, they are reported planning to spend $18,000,000 to $20,000,000 in bringing gas to the city and extending the present distributing system. The statement is credited to Augustus G. Williams, of New Orleans, who appears as representative and spokesman for the interests seeking the franchise, in replying to the statement of a city commissioner who wants Williams' principals to make some sort of guarantee that they are able to and will carry out the project themselves and not peddle the franchise to someone else in the event they got it. In reply, Williams said his principals were willing to put up a $50,000 bond for their fulfillment of the franchise contract.

NACOGDOCHES GETS GAS

HOUSTON, Tex., Feb. 18.—Natural gas was turned into the new distribution system at Nacogdoches, Tex., for the first time the past week. The Dixie Gas & Fuel Co., the distributing company, receives its supply from the Dixie Gulf Gas Co., which recently completed its large line from Waskom, Tex., to Houston and Port Arthur.

U. G. I. REPORT

PHILADELPHIA, Pa., Feb. 18.—The United Gas Improvement Co. in 1927 earned net profits of $12,934,457. This is 12.56 per cent on the average capital stock outstanding during the year and represents an increase in net profits of $3,591,843, it was stated. The company's earnings in 1927 from regular sources were $12,124,364, an increase of $1,803,786; from special sources (sale of investments), $1,814,926, an increase of $1,072,693. The total earnings were $13,939,290, an increase of $2,876,480. Taxes, salaries and expenses amounted to $1,633,845, a decrease of $330,957. Capital stock dividends paid during the year amounted to $1,633,845, a decrease of $330,957. Capital stock dividends paid during the year amounted to $8,144,072, an increase of $1,627,184. The balance to undivided profit account was $4,790,385, an increase of $1,964,659.

LOS ANGELES GAS OUTPUT

Natural gas output in Los Angeles territory reached 200,000,000 feet on December 21, and has approximated that daily figure several times during the cold weather. On high output days as much as 30,000,000 feet has been diverted from industrial to domestic consumers.

EASTERN GAS MERGER REPORTED IN NEW YORK

NEW YORK, Feb. 18.—The General Electric Co. and the Westinghouse Electric & Manufacturing Co. were described in Wall Street, according to the New York Times, as interested in the superpower system in which it is proposed that the Consolidated Gas Co, the Brooklyn Union Gas Co. and the Brooklyn Edison Co. shall have a place as the result of a consolidation. Banking circles for many months have considered a merger of the utilities in Greater New York as inevitable and have believed that their consolidation eventually would make them part of a great superpower system that already runs from Philadelphia through New Jersey and Northern New York to Massachusetts.

It is considered certain in public utility circles that the impending New York City merger would take in all Westchester County, where the Consolidated Gas Co. already is entrenched, and also all Long Island. Practically all important utilities from the boundary of Queens to Montauk Point are controlled by interests headed by E. L. Phillips. Two of the three nominally independent utilties in Brooklyn and Queens are controlled by the Phillips interest. The Brooklyn Borough Gas Co. is controlled by interests of the United Gas Improvement Co. of Philadelphia.

United Gas Improvement, which in turn is dominated by the Mellon interests of Pittsburgh, controls the Public Service Corp. of New Jersey and with the General Electric Co. and the Brady interests it controls the network of the up-State power systems eventually to be merged with the New York utilities.

The merger automatically would include the New York Edison Co., one of the largest organizations of its kind, and the United Electric Light & Power Co., as both of these companies are owned by the Consolidated Gas Co.

The name of the company proposed for the merger of the three utilities has been reported as the "Hudson Security Co." or the "Hudson Securities Corp." These names apparently refer to the Hudson Stock Corp., which was formed by the General Electric Co. recently to merge two investment companies which it controls. The Hudson Stock Corp. is now dissolved, but for a time it held Consolidated Gas and Brooklyn Union Gas stock acquired by one of the merging companies.

ALLEN FIELD LINE COMPLETED

The new Southwest Gas Co. pipe line from the north gas producing field near Ada, Okla., to the Allen Field has been completed. This line has a capacity of 50,000,000 feet daily and is now taking about 30,000,000 feet from the connected wells. This gas is to be used in the city of Ada and by industries in the vicinity. The town of Francis also will be supplied with gas from the main pipe line connecting Ada with the Allen field.

BAY CITY, TEX., FRANCHISE

HOUSTON, Tex., Feb. 18.—Houston Natural Gas Co. has been granted a franchise to pipe Bay City, Matagorda County, and distribute natural gas there. The gas would be supplied from the company's line from Southwest Texas to Houston.

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DRILLING ENGINES
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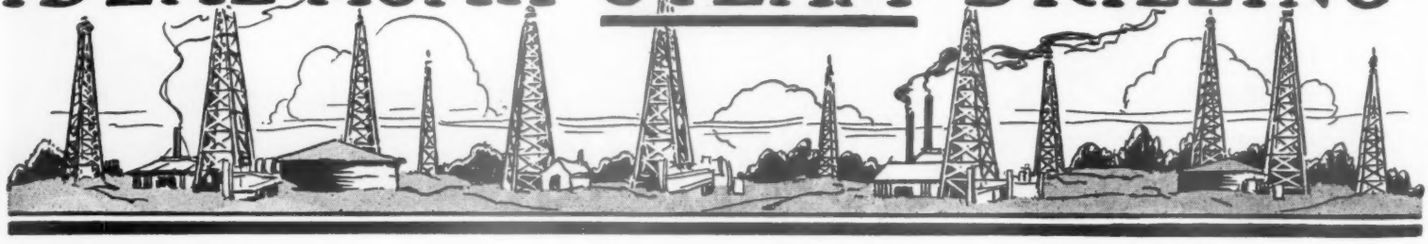
extra power
for the
emergency

AJAX ENGINES

IDEAL-AJAX STEAM DRILLING



INVITES TROUBLE
in the well

There is plenty of "grief" in the drilling of wells without seeking more. It is only inviting calamity to rig your tools to an engine too small to do the job. Every driller knows this.

Yet sometimes drillers forget the margin of *extra power* that is needed in an emergency.

A 60 H.P. engine cannot deliver a single unit of power beyond its rating. The power delivered by a steam engine can be *doubled* by increasing the boiler pressure.

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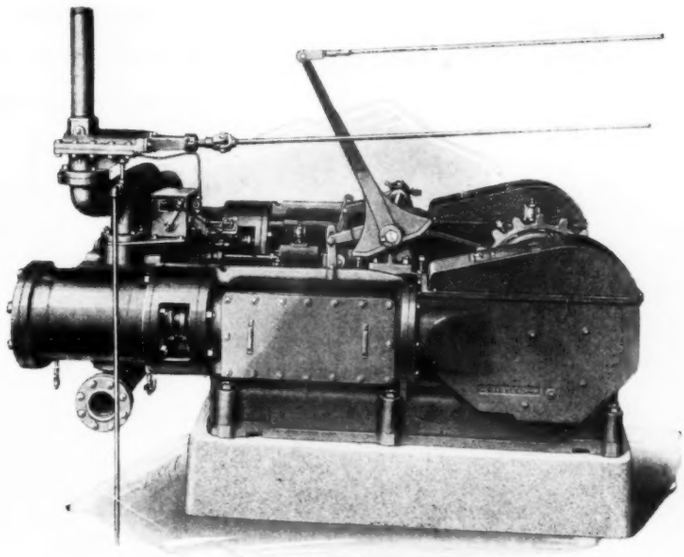
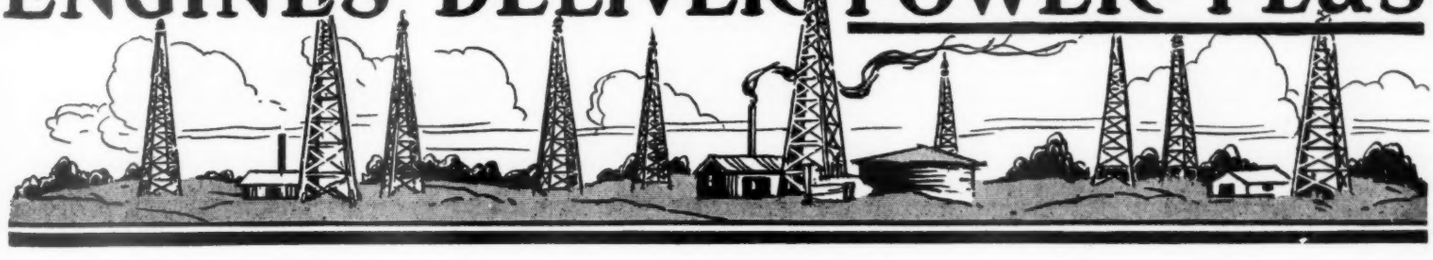
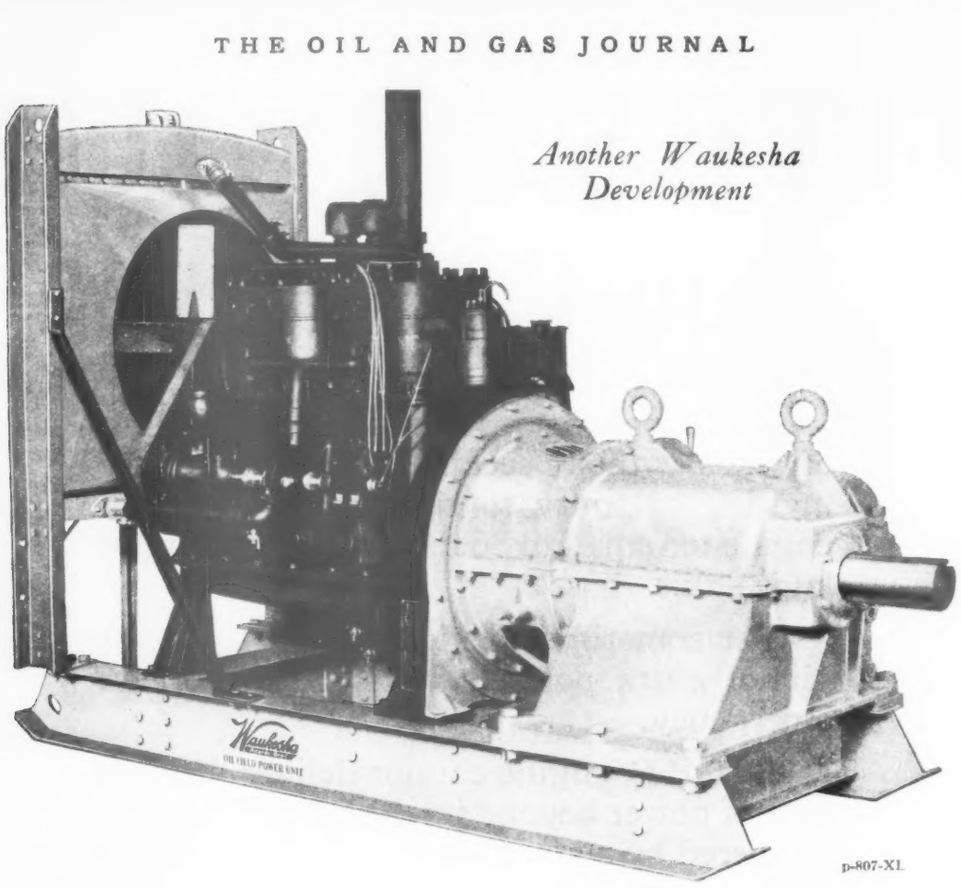
In every oil field



ENGINES DELIVER POWER-PLUS





Another Waukesha Development

p-807-XL

Setting a New Standard

Waukesha heavy-duty engines and Oil Field Power Units are the standard of comparison with oil production men. This Herringbone Speed Reducer is backed by two years experimental work in the field plus years of close association with the oil industry in supplying gas power units. It sets a new standard in speed reducing gears for oil field work.

These Herringbone Speed Reducers provide several novel features of particular value and interest to production men who are interested in the minimum loss of production time. The ready accessibility of the clutch, the complete yet easily removable shafts and gears due to the horizontal division of the gear box and the use of ball bearings and unusually large shafts will appeal to all practical field men. Write for Bulletin 656 describing this new unit.

P-816-XL

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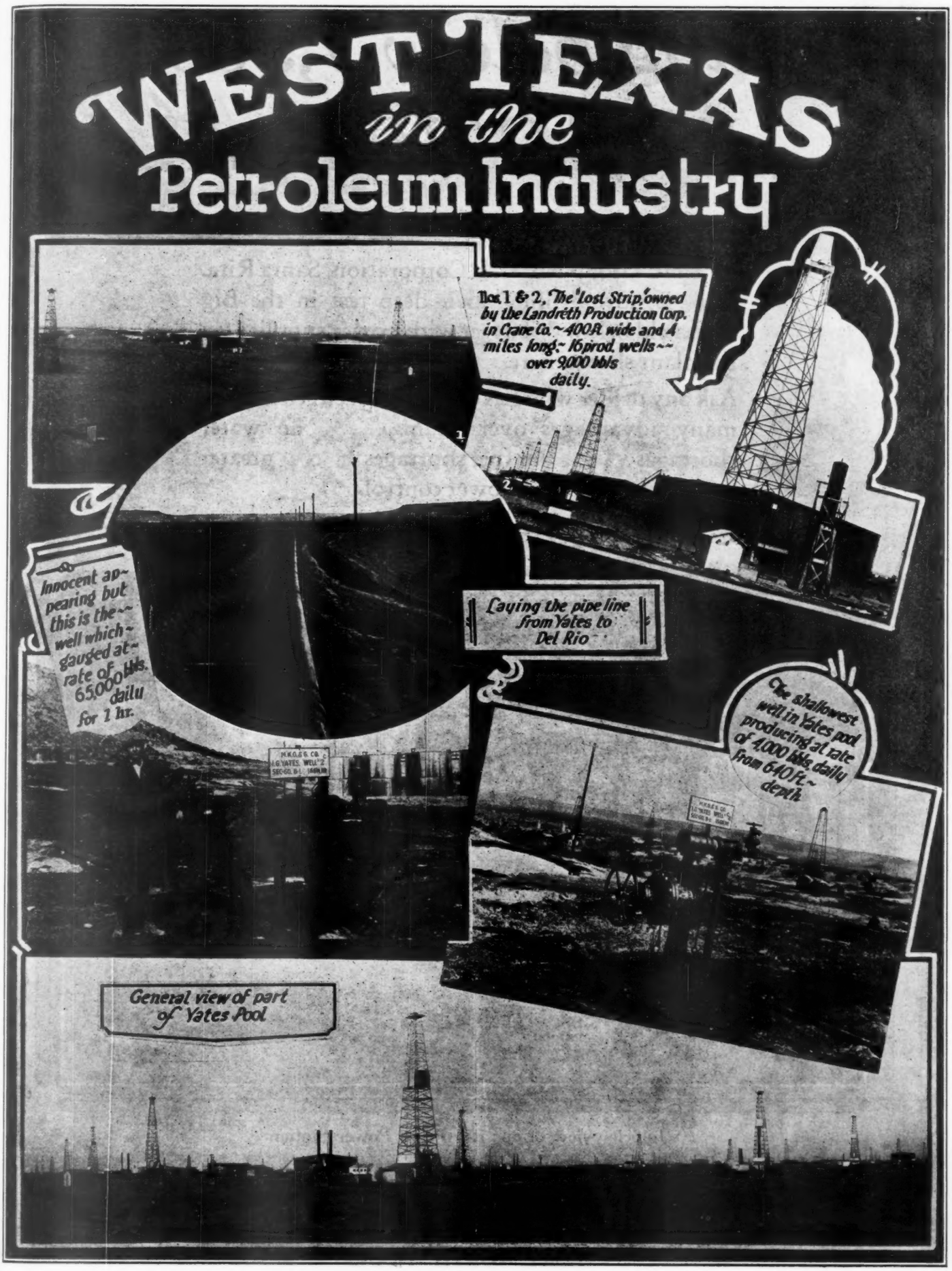
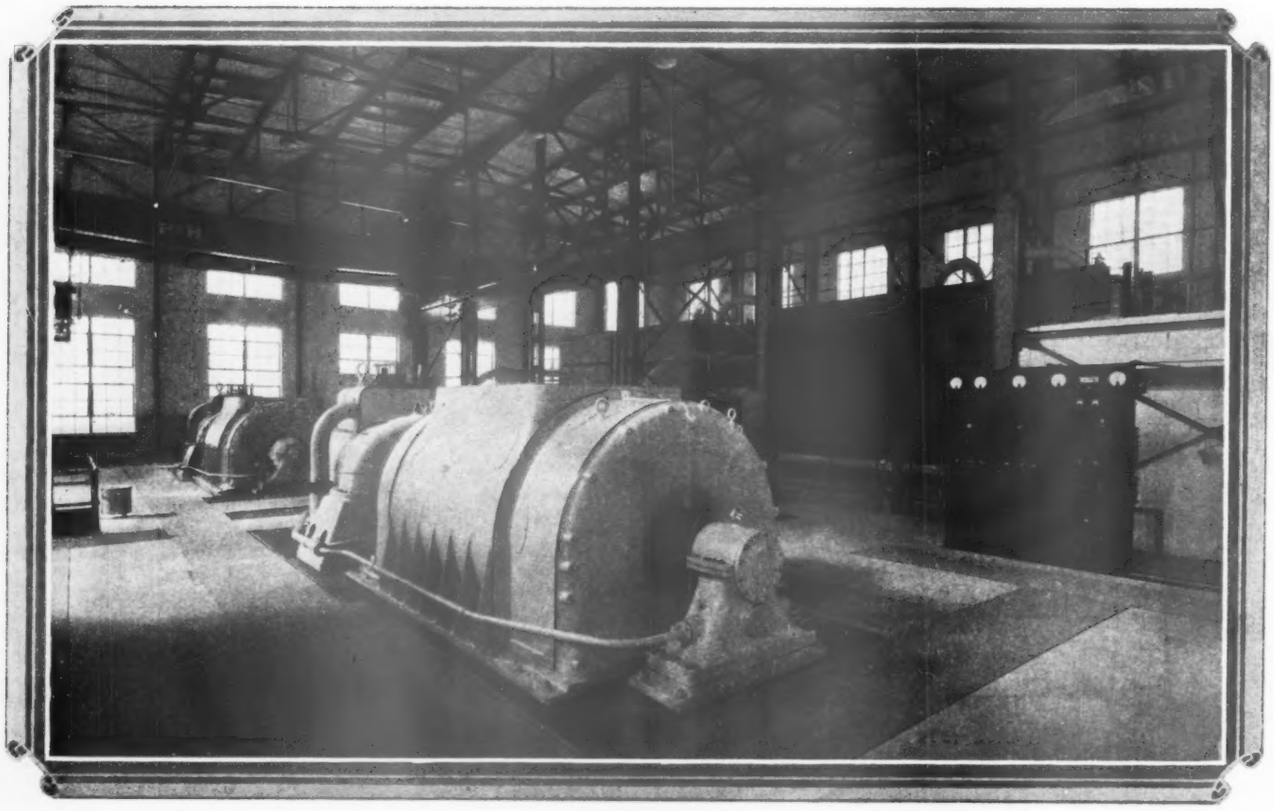

WEST TEXAS
in the
Petroleum Industry
Nos. 1 & 2, The "Lost Strip," owned by the Landreth Production Corp. in Crane Co. ~ 400 ft. wide and 4 miles long. ~ 16 prod. wells ~~ over 9,000 bbls daily.
Innocent appearing but this is the ~~ well which ~ gauged at ~ rate of 65,000 bbls. daily for 1 hr.
Laying the pipe line from Yates to Del Rio
The shallowest well in Yates pool producing at rate of 4,000 bbls. daily from 640 ft. ~ depth
General view of part of Yates Pool

Drilling below 7,500 feet ELECTRICALLY

THE Group No. 1 Oil Corporation, Santa Rita, is now drilling their deep test in the Big Lake field below 7,500 feet with power supplied by the plant shown here.

Ask any driller who has drilled with electricity the many advantages over steam . . . no water shortages . . . no fuel shortages . . . greater speed . . . perfect power control.



Interior view of our Rio Pecos Power Station.

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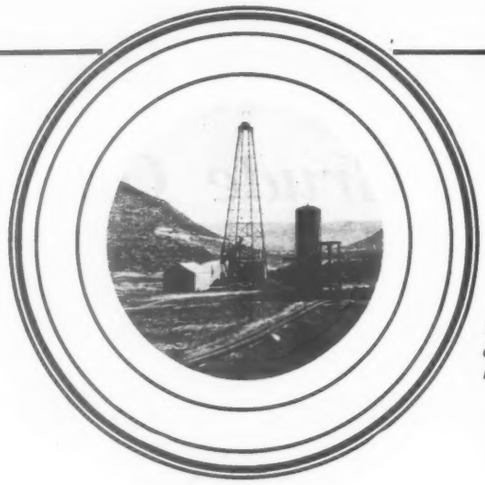
A SECTION OF THE PANORAMA OF THE YATES POOL, PECOS COUNTY, WEST TEXAS, WHERE TRANSCONTINENTAL'S DISCOVERY WELL IS LOCATED.



The Transcontinental wonder well which flowed 2,059 bbls. in 45 minutes, when opened last November.

OPEN SESAME...

When the "Open Sesame" of the West Texas field, in Pecos County was discovered, Transcontinental was ahead of the legion again.

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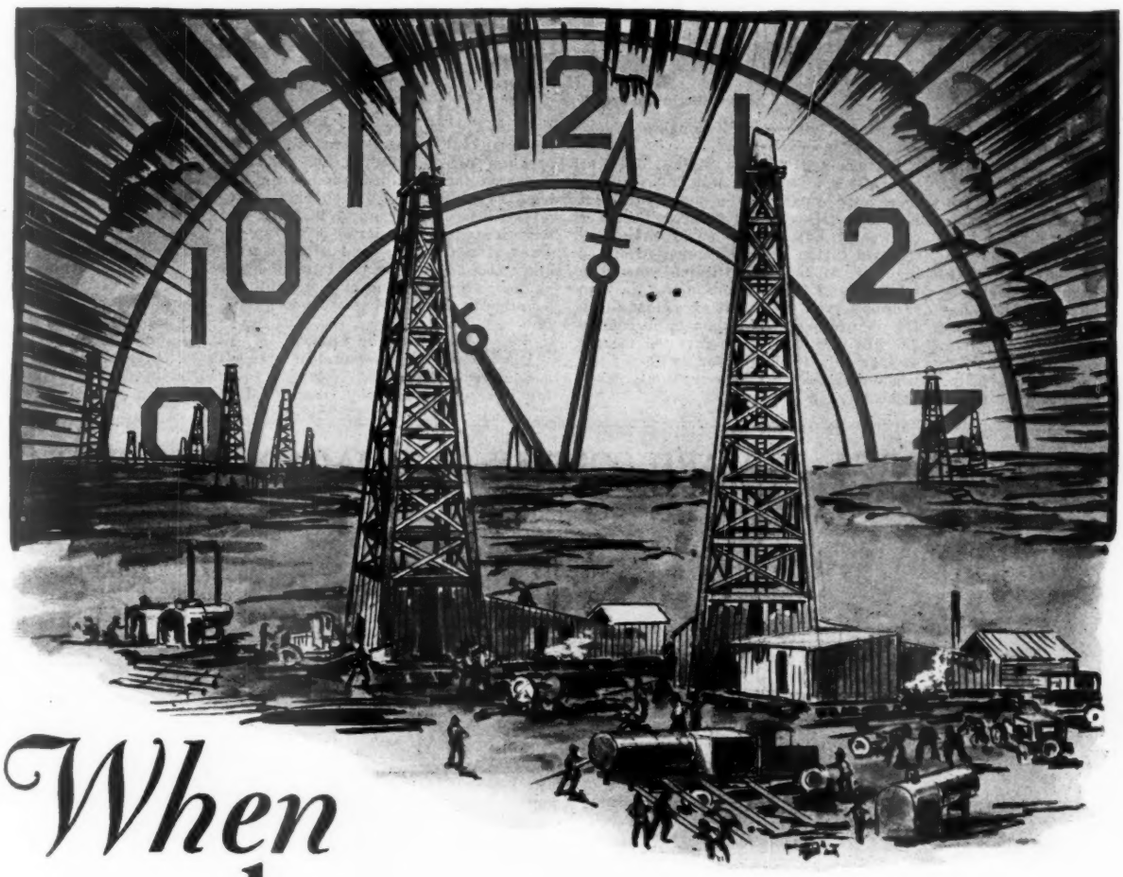

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CONTINENTAL

From Cow Country to Oil Klondike

Discovery of Big Lake Field Started West Texas Development Which Transformed Vast Area Into Thriving Business Sections

By James H. Dameron
Fort Worth Bureau, The Oil and Gas Journal

For years West Texas, the new El Dorado in the oil industry's history, was popularly known as the broad open spaces rich in lore for the writer of short stories on western plain life. Its history as the home of the Indian and thundering herds of buffalo and lonesome cowboys listening to winds roaring over the semiarid chaparral country, was drawn on richly, and in time thoughts of that vast territory were linked with thoughts of six guns and bloody battles.

It remained for the Midas touch of wildcatters to transform it from a lonesome cow country to a new petroleum Klondike. Its gushers spouted a shower of wealth but at the same time contributed to the general depression of the industry. Struggling cattlemen were made wealthy and flag stations along the two railroads grew into thriving communities. Its picturesque flash, though, is colored dismally for many who invested meager savings into a chance for swift fortune when they read of the sensational developments of a gusher.

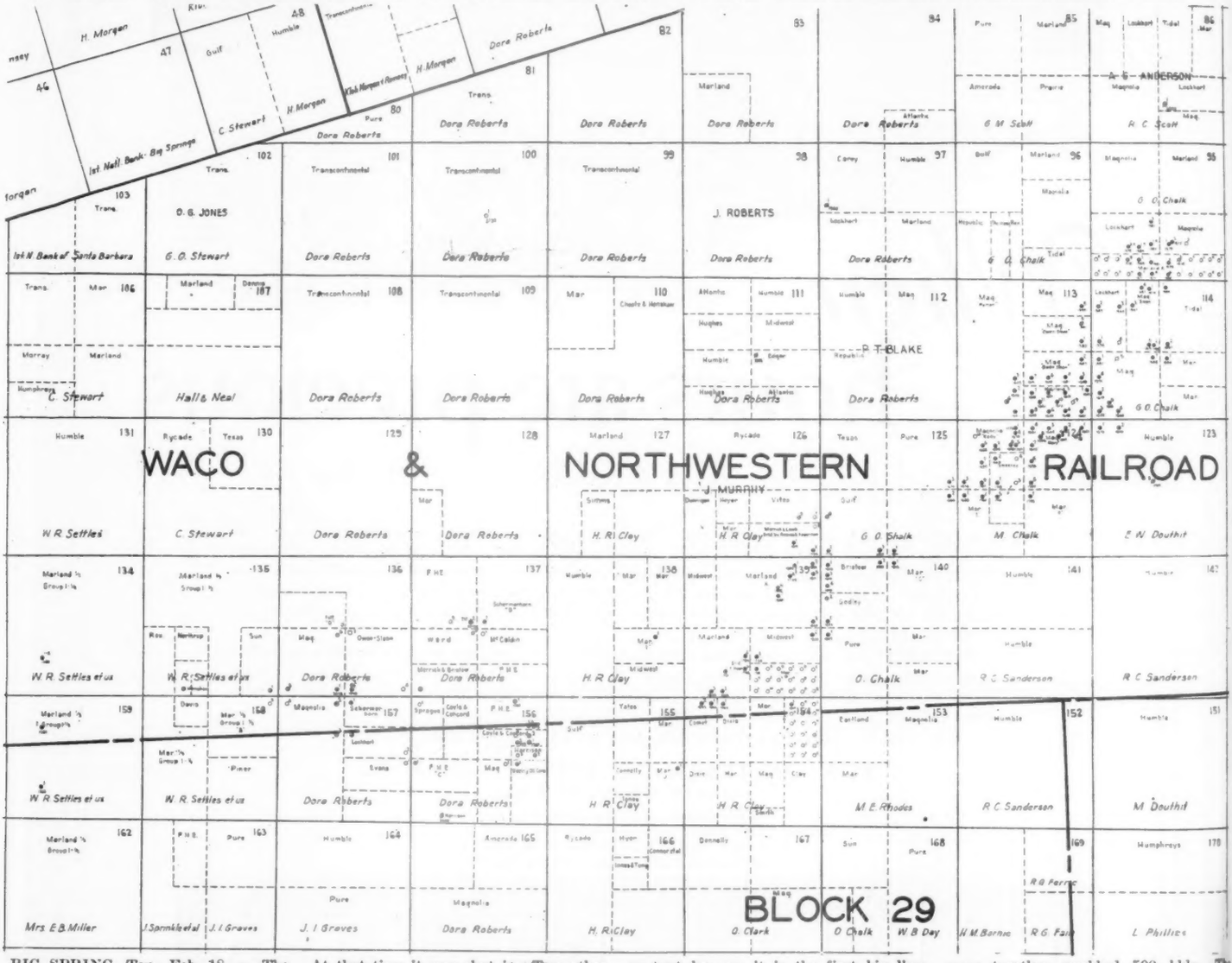
With the tapping of the reserves in that colorful country there followed a program for building it up. Railroads improved their facilities and train service. Towns grew in a manner that represented permanency and highway construction work moved and is moving forward at a pace as rapid as that set in other sections of Texas. Pipe line companies extended long carriers into the country to transport its crude production.

Discovered by Chance

Discovery of the new prolific area was accelerated by chance. Nearly everyone familiar with the region has heard the story of Big Lake in Reagan County, one of the most unique fields in the industry. An officer after his discharge from the army found himself free from association with an occupation deriving steady income. He read of a geological report on West Texas and decided to take a chance upon some University land in Reagan County. He met another, a former associate in the army, who was a good salesman. The Texon Oil & Land Co. was organized and the first well financed.

A location was staked and equipment shipped out and unloaded on the prairie. When it came time to move on location,

MAP OF CHALK AREA, HOWARD COUNTY AND MAGNOLIA-ROBERTS AREA



BIG SPRING, Tex., Feb. 18. — The above map is of two areas in Howard County that have been discovered within the past few months. The small area in Tracts 136 and 157 is the deep lime production discovered in southern Howard County by the Magnolia Petroleum Co. when it brought in a well making better than 3,000 bbls. daily. The well held up at that rate for three months. At that time it was shut in. Two other wells have since been drilled into the deep pay and both rank close to the discovery well in production. The three deep producers are Magnolia company's No. 1 Dora Roberts, Owens & Sloan's No. 2 Dora Roberts and Schermerhorn's No. 1 Dora Roberts. All three wells will be produced under a proration plan. One 4-inch line serves that area.

This area is considered especially important because it is the first big lime production on the east flank of the Permian Salt Basin.

To the east of this area, Marland Oil Co. and Texon Oil & Land Co. opened the Settles Field in March, 1927, with a 150-bbl. well at 1,230-63 feet. The well was later deepened to 1,313 feet and drilled into sulphur water. It was plugged back. A second pay was found in this well at 1,297 feet and the two pays together swabbed 500 bbls. The well was shut because of inadequate storage and pipe line facilities. The well at present is being drilled on down to the big lime. Two other wells have been drilled by the discoverers, one to the north and the other to the south. What is being produced from the two wells on production is going to storage.

Four separate pays are found in this area.

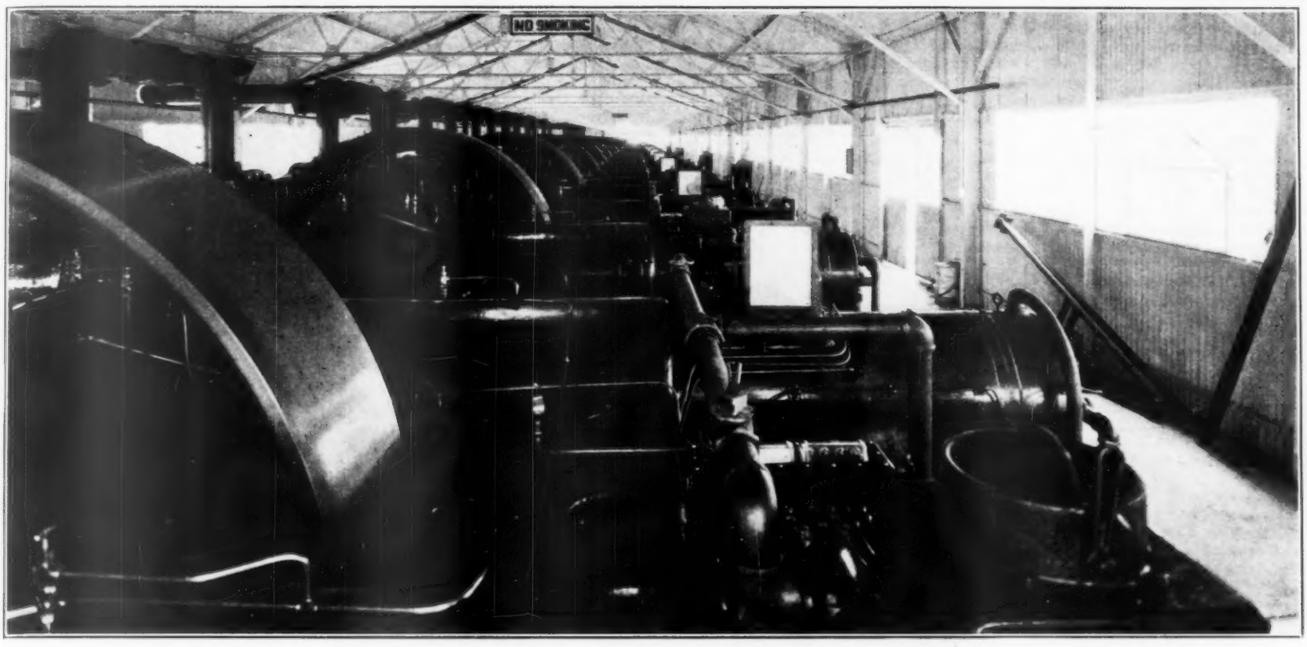
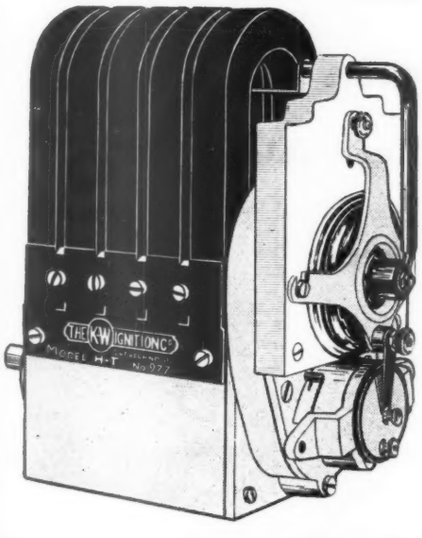


ILLUSTRATION OF THE PANTEX PLANT OF THE PHILLIPS PETROLEUM CO. WHICH HAS TWENTY-SEVEN 165 H.P. CLARK GAS ENGINES EQUIPPED

WITH THE TRADE K-W MARK Magneto



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the crew rigged up on the spot where equipment was dumped rather than move it across the prairie to the staked location. The hole was drilled and a 90-bbl. well discovered proving the presence of a pool.

The strange part of it is that the original location was later found to be in dry territory.

Big Lake development followed after some delay and has made the University of Texas the wealthiest of universities. Odd, too, is the fact that the former army officer is a graduate of that school. This pool is being produced by two companies and its production today, after almost four years of life, is around 22,000 bbls. It has a large number of locations yet undrilled and it is estimated that production could be increased to around 50,000 bbls. and held at that figure for a goodly period.

This field made another record only recently when Pennsylvanian oil was discovered in pay topped at 6,250 feet. The crude is sweet and tests 38.7 gravity. Eighteen hundred feet of oil rose in the hole and at present the well is shut down at 7,140 feet.

Opened Doors to West Texas

Five miles south of this field, Skelly Oil Co. and Utah Southern Oil Co. have tapped another pool. Their initial well pumped 35 bbls. of 32.5 gravity crude. It is believed the well is on the eastern edge of a pool not as large, however, as the Big Lake Pool.

Big Lake opened the doors to West Texas development. Oil men came in from other oil-producing areas and started buying acreage in all directions, and every Texas operator evinced his interest in the new territory heretofore unexplored and thought of little importance. During the past 14 months such big pools at Yates, Church and Fields, McElroy and Hendricks have been drilled into prominence.

Today West Texas has a production of around 300,000 bbls. daily and it is estimated the region could produce from 600 000 to 1,000,000 bbls. daily. One field alone, Yates, is thought to be capable of making 600,000 bbls. daily. This estimate is based on the hourly gauges of the producing wells but water encroachment in that field leads to the thought it would make water in a few days if produced at its maximum.

Following the discovery of Big Lake the McCamey district in Upton County was next in the picture of big development. That district was fairly well drilled during 1926. McCamey became a concentration point as a result of the discoveries in the area and many companies are operating out of McCamey. Production of Upton County at the present writing is around 16,000 bbls. daily.

Crane County development followed on the heels of Upton discoveries and the Church and Fields Pool was the next drilled in as one of the four ranking pools of West Texas. It has been extended south to the Gulf Production Co.'s McElroy properties which have an interesting history.

McElroy Land Productive

J. T. McElroy, an old-time rancher with several herds of cattle, was reluctant to lease his ranch comprising around 150,000 acres. Finally, William Dunning, a Fort Worth operator and former cowhand on the McElroy ranch, induced him to lease the ranch with the exception of a quarter section which he reserved. Dunning in turn sold many of the leases to the Gulf company.

Incidentally, any J. T. McElroy property is a bonanza for the Gulf company, if recent developments can be considered as proof. Recently the Gulf company's No. 4 McElroy opened up production on Sorrento Dome in Ascension Parish, Louisiana. The Gulf company had previously discovered production on a tract of land owned by McElroy in the early development of Louisiana.

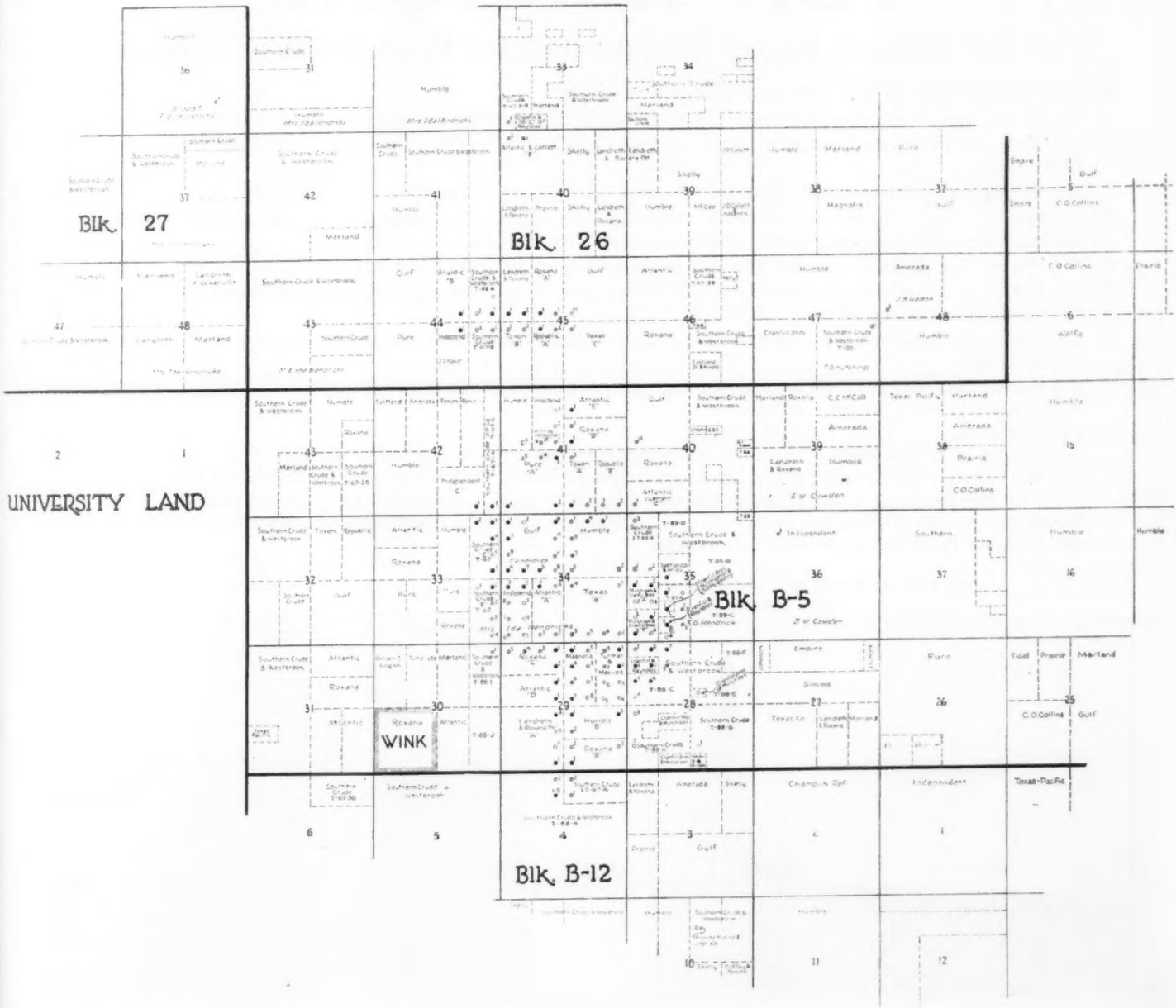
At the present writing the limits of Church and Fields and McElroy Pools have not been defined to the north and south. The fields have been defined to the east and west. One of the most intensive drilling campaigns of 1927 was waged on the line between Church and Fields and McElroy. Sandwiched in between Gulf-McElroy and producing properties on the north a vacant strip was leased by the Landreth Production Corp., and an intensive drilling campaign carried on in the south end of Church and Fields.

On the Landreth strip, the greatest well in Crane County was drilled. No. 11 State-Cowden-Anderson came in early in August making 8,990 bbls. and during the first 100 days it produced 7,160 bbls. daily. At present the well is still making around 6,000 bbls. daily.

Church and Fields, including the Gulf company's McElroy leases, reached a peak of 120,000 bbls. daily in 1927. That figure does not represent its true peak. Inadequate pipe line facilities made it imperative to pinch in many of the best wells in the field. It figures largely in the potential production of West Texas because its limits are still undefined. Gulf company has not drilled any further south than its No. 6 Crier-McElroy, in Section 196, and a little less than 4 miles south of production on the northern part of the Gulf company's McElroy leases.

Production on the Gulf company's property is not making water while several wells in the original Church and Fields Pool are. Water, however, has not encroached seriously. The average

(Continued on Page 119)



The Hendricks Pool, Winkler County, Texas.

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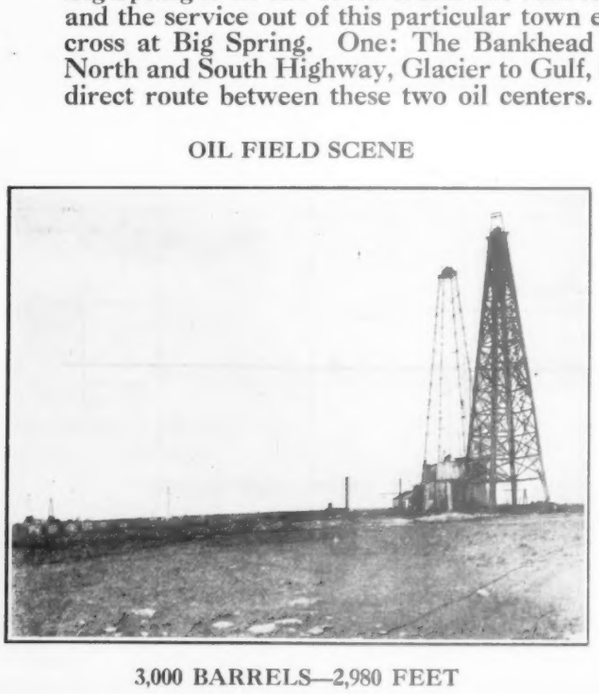
TEN REASONS

Why Big Spring is logical headquarters for West Texas development:

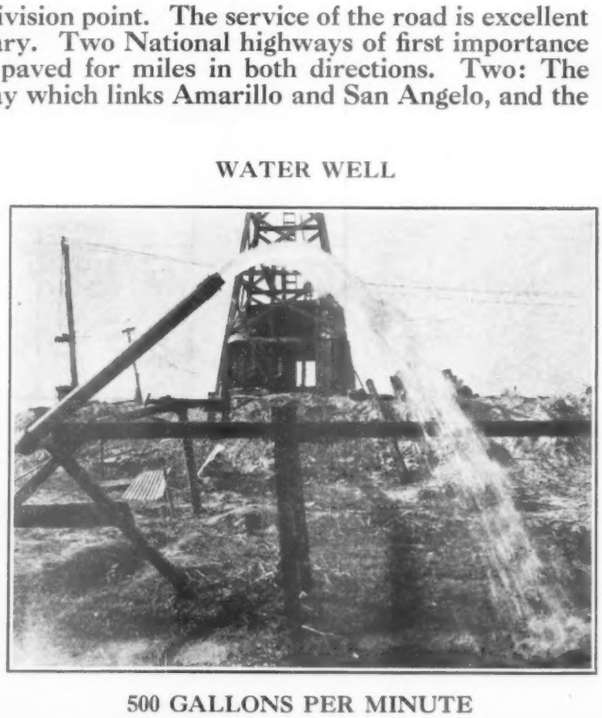
1. Big Spring is the largest city near center of activity.
2. Big Spring has all city conveniences including gas and electricity for domestic and industrial purposes.
3. Big Spring has an abundance of water that tests 99.52% pure. (It's cool and refreshing—no unpleasant after effects.)
4. Big Spring has highest ranking public schools of any West Texas City near oil fields.
5. Big Spring is building for the oil people who are here and who are coming, providing more homes, more paving, more schools, more water and more and better hotels.
6. Big Spring has 24 hour service over Western Union and Postal Telegraph.
7. Big Spring has 8 passenger trains each 24 hours and at present an average of 38 freight trains making transportation rapid and convenient.
8. Big Spring is substantially supported by oil, agriculture, livestock, railroad payroll and an immense tourist trade.
9. Big Spring has one new seven story fire-proof hotel with another modern one under construction, added to these are several smaller hotels.
10. TRANSPORTATION FACILITIES:
Big Spring is on one of the trunk line railroads and a division point. The service of the road is excellent and the service out of this particular town extraordinary. Two National highways of first importance cross at Big Spring. One: The Bankhead Highway paved for miles in both directions. Two: The North and South Highway, Glacier to Gulf, the highway which links Amarillo and San Angelo, and the direct route between these two oil centers.

OIL FIELD SCENE



3,000 BARRELS—2,980 FEET

WATER WELL

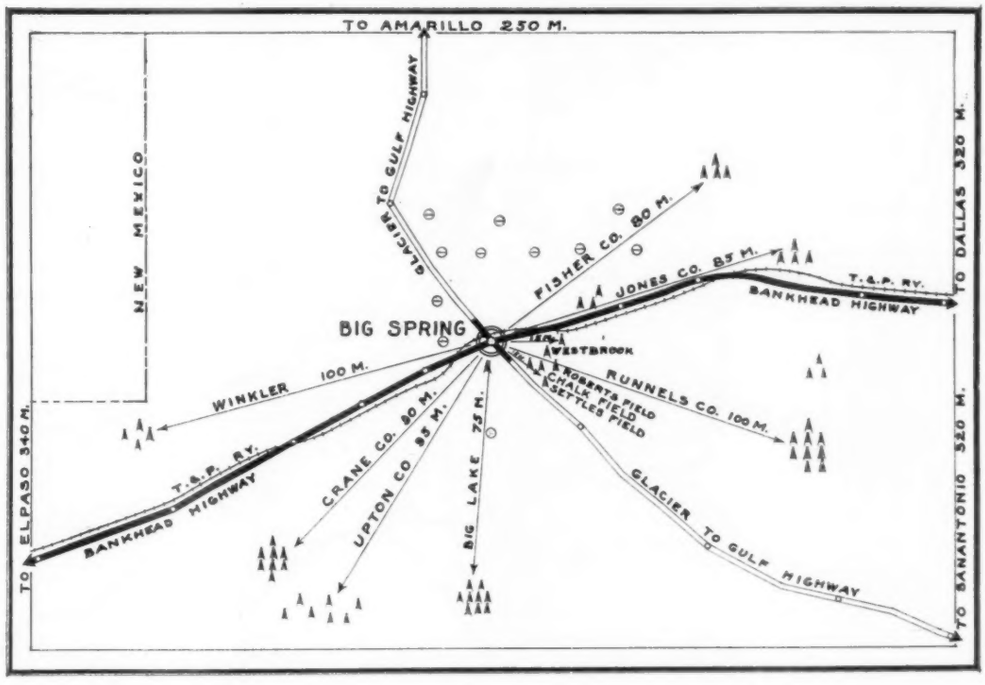


500 GALLONS PER MINUTE

NG TEXAS

Howard County has 120 producing wells within a radius of 5 to 20 miles of Big Spring

Why Big Spring is logical operating center



In the Fields:

1. There is an abundance of drilling water.
2. An ample supply of natural gas and oil can be had in the field for drilling fuel.
3. Five known producing horizons ranging in depths as follows: 1,100, 1,300, 1,800, 2,500, 3,000 feet.
4. More than 30 companies operating in the Big Spring area.
5. The limits of the productive area are yet unknown, there being producing wells as far as 20 miles apart.
6. The shallow wells brought in recently are sweet crude and from sand formations.
7. On account of cheap fuel, ample water and shallow depths to production, drilling is done at nominal cost.

Big Spring is one of the most substantial towns on the Texas and Pacific Railroad, and was a town of 6,000 people before oil was discovered.

Big Spring now has a population of 8,000 and people are buying property each day building business houses and homes.

Seventy-five homes under construction—now—

Fifteen brick and tile business houses being built.

40,000 yards of residential street paving being laid. Several thousand yards of extensions in gas, water, electric and telephone lines, going into new residential districts.

YOU CAN'T GO WRONG IN BIG SPRING

For men of means are investing in city and urban property. Royalties, leases, real estate, ranches and farms are being sold, bought and resold at a profit.

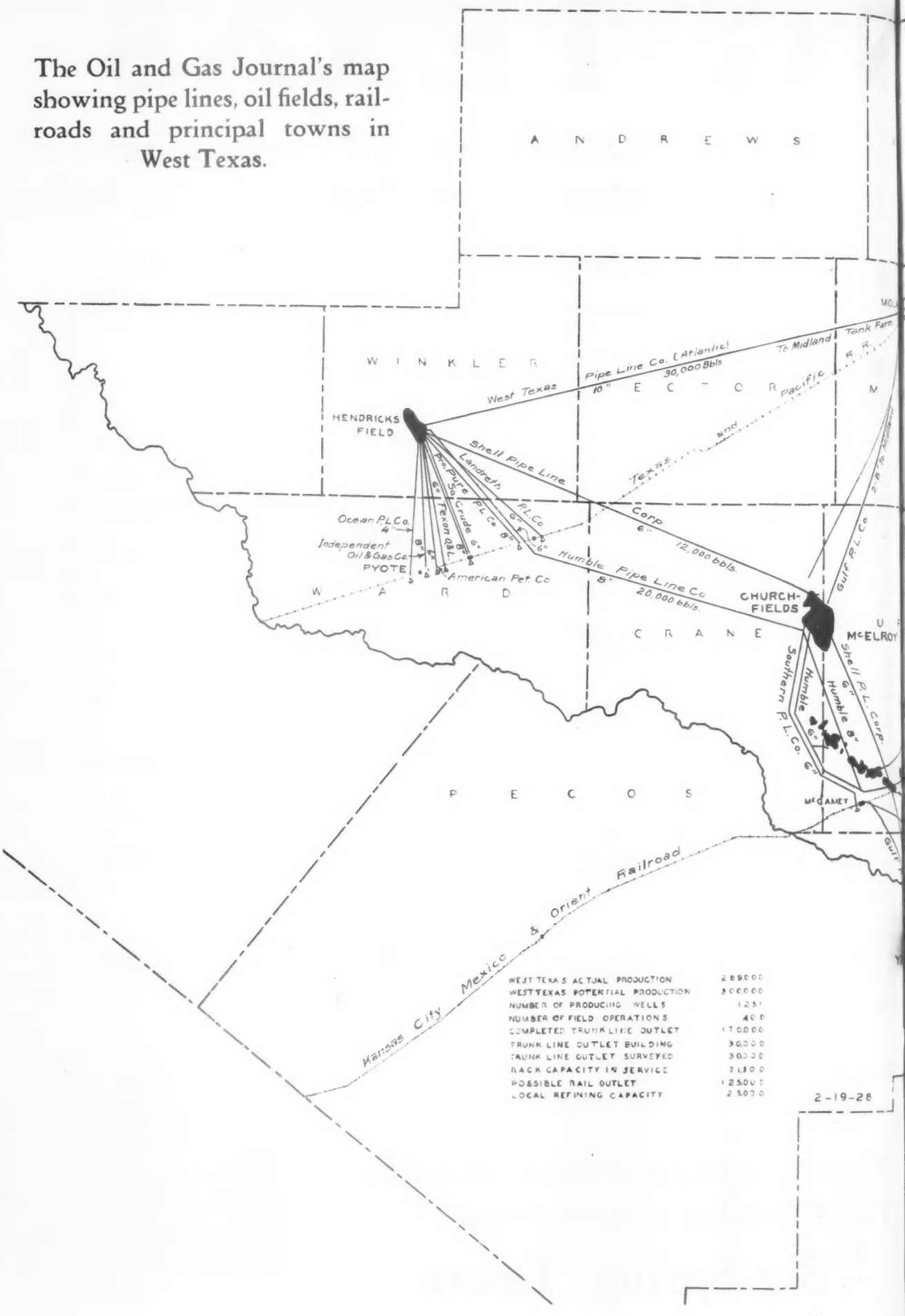
Buy—build and live in Big Spring—the "Oil Center" with *Five* sources of income.

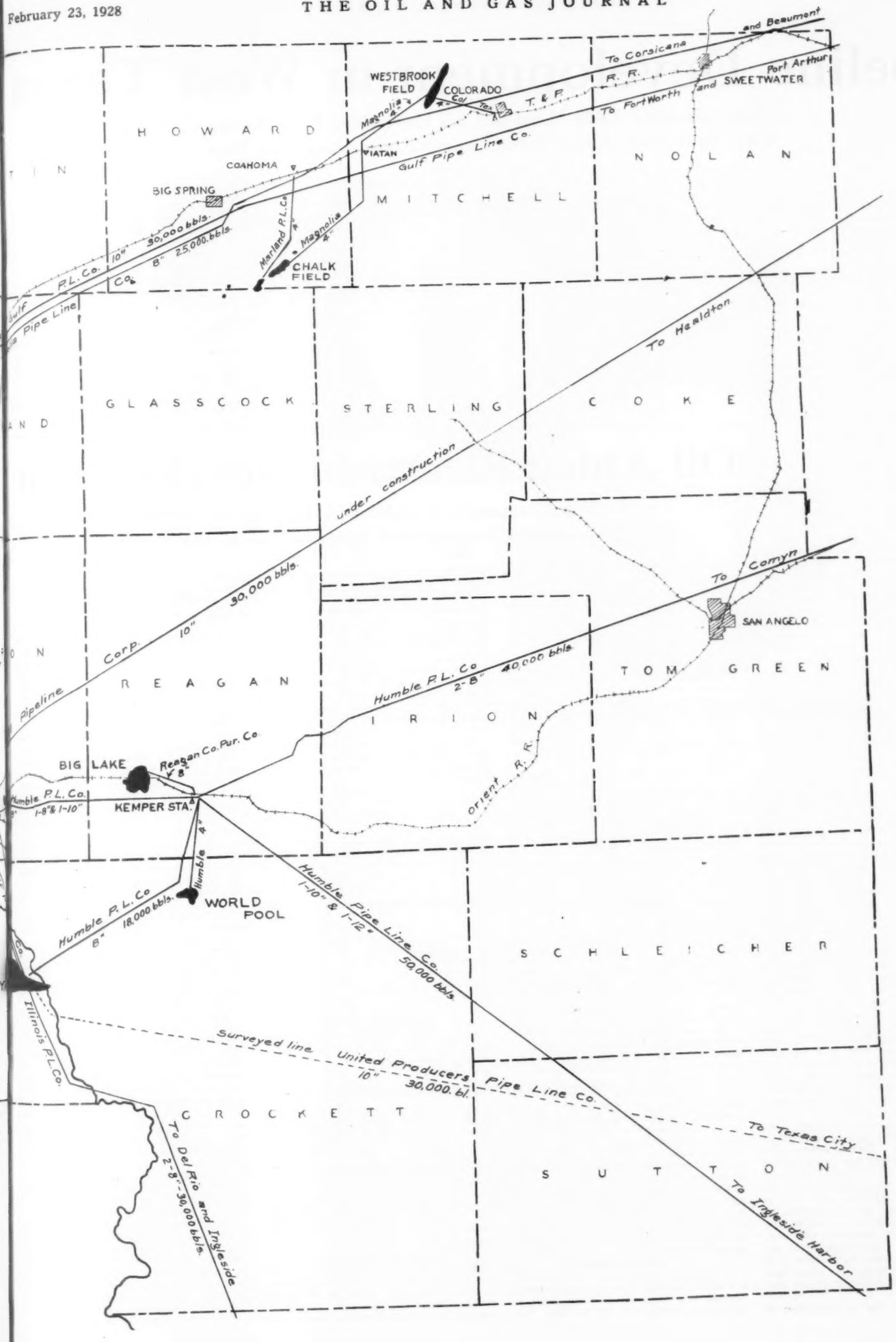
Your inquiries will be answered by The Chamber of Commerce

Big Spring, Texas

HOTEL

The Oil and Gas Journal's map showing pipe lines, oil fields, railroads and principal towns in West Texas.




WESTBROOK FIELD
COLORADO
To Corsicana and Beaumont
R. R.
Port Arthur
T. & P.
To Fort Worth and SWEETWATER
Magnolia
Col
Tex
HOWARD
VIATAN
Gulf Pipe Line Co.
COAHOMA
NOLAN
BIG SPRING
MITCHELL
Marland P.L.Co
Magnolia
CHALK FIELD
Gulf P.L. Co.
10"
30,000 bbls.
8"
25,000 bbls.
Co.
To Healdton
GLASSCOCK
STERLING
COKE
under construction
30,000 bbls.
Corp.
10"
Pipeline
To Comyn
SAN ANGELO
REAGAN
Humble P.L. Co
2-8"
40,000 bbls.
TOM GREEN
IRION
Orient R.R.
BIG LAKE
Reagan Co. Pur. Co
8"
Humble P.L. Co
1-8" & 1-10"
KEMPER STA.
Humble
4"
Humble P.L. Co
8"
18,000 bbls.
WORLD POOL
Humble Pipe Line Co.
1-10" & 1-12"
50,000 bbls.
SCHLEICHER
Illinois P.L.Co.
Surveyed line United Producers
10"
30,000 bbl
Pipe Line Co.
CROCKETT
To Texas City
SUTTON
To Del Rio and Ingleside
2-8"-30,000 bbls.
To Ingleside Harbor

Pipeline Development in West Texas

Approximately 2,000 Miles of Line Have Been Laid During Past Year With About Same Length Planned for This Year

By James H. Dameron
Fort Worth Bureau, The Oil and Gas Journal

Superlatives have been used almost to a droning repetition in describing the remarkable development of pipe line construction in West Texas during the process of etching that area in the petroleum industry. But out there in the broad open spaces of sand and mountains where the McElroys, Yates and Hendricks have been disturbing affairs of the industry, developments have been epochal to say the least.

Numerically, the completion of four trunk outlets is not an imposing statement. Seminole's flood was easily moved, comparatively speaking, because the field was close to several trunk arteries. But West Texas was 200 and 300 miles removed from the nearest trunk line and around 400 miles distant from desirable harbor facilities.

Lines had to be built through mud, over sand hills, over low mountains and through deep canyons. Rail facilities afforded by the two railroads were crowded and highways in numerous instances were even short of cow trails.

To date the pipe line departments have constructed facilities to move around 266,000 bbls. daily from the several pools. That figure includes the present loading rack capacity figured to be in service, the local refining capacity and the combined trunk outlets to the coast.

Humble Built First Line

Pipe line building dates back to what is generally known as the discovery of West Texas, which was the opening of the Big Lake Field in Reagan County in May, 1923. When that field proved its worth the Humble Pipe Line Co. built the first main system to the territory from its main line to the coast. It was an 8-inch line from Kemper Station, east of Big Lake, to Comyn Station in Comanche County. Since then the line has been looped with 8-inch pipe to build the capacity up to 40,000 bbls. daily.

At present West Texas has an outlet for 170,000 bbls. daily through trunk lines. With two main lines having a combined capacity of 90,000 bbls. daily, the Humble company leads in line capacity out of the area. Its largest line, a combination 10 and 12-ich line to Ingleside Harbor, has been looped and has a capacity of 50,000 bbls. daily and was completed in time to afford relief from an acute storage situation. Gulf Pipe Line Co. built a 10-inch carrier from Crane County to Ranger station where the line intersects the Gulf company's main line system to Port Arthur. The line is rated 25,000 bbls. capacity. Magnolia Pipe Line Co. finished an 8-inch artery from Crane County to DeLeon station in Comanche County where the line intersects the trunk system to Beaumont. That line is generally rated as a 25,000-bbl. line which may be 5,000 bbls. high. Illinois Pipe Line Co. built the remaining outlet with an 8-inch carrier from Yates Field to Del Rio in Val Verde County. Del Rio is on the Southern Pacific Railroad and a 2,000,000-bbl. tank site was purchased at that place and a loading rack built.

The Illinois company's line has been looped with 8-inch pipe and is rated as a 30,000-bbl. line. Illinois company is now building a 10-inch line east from Del Rio to intersect the Humble company's line at a point near Ingleside. It is reported that 20,000 bbls. daily will be moved through the 10-inch carrier.

Humble Pipe Line Co. is making preliminary surveys to determine the feasibility of building a line from Lytle station, near San Antonio, to Webster tank farm, south of Houston. No plans have been made for the building of the line, however.

Building of the line is contingent to litigation. Humble company's 50,000-bbl. capacity line to Ingleside Harbor was built with the view of establishing deep water loading facilities there. The harbor, with its present channel depth, permits the tankers to be loaded to 60 per cent capacity. That necessitates tankers going to deeper waters to complete their cargo. To remedy the situation the pipe line company started building deep water loading racks in the Gulf off Mustand Island near Ingleside. Completion of the plan is being held up by court action.

Completed in 1927

The foregoing pipe lines, however, afford West Texas its present trunk outlet. All of the projects, except the Humble company's, were completed in 1927. It is estimated that approximately 2,000 miles of pipe have been laid in West Texas in the past year at a cost well above $50,000,000.

The West Texas Pipe Line Co. (Atlantic Oil Producing Co. subsidiary) just recently completed a 10-inch welded line from the Hendricks Field in Winkler County to the Atlantic company's Midland tank farm. It has a rated capacity of 30,000 bbls. daily. The Atlantic company's as well as Magnolia Petroleum Co.'s production from Hendricks will be sent through the line. Magnolia Pipe Line Co. will take the oil at the terminal and transfer it to the Magnolia company's main line running east.

Shell Pipe Line Corp. is the most active company in constructing work at present. The Roxana Petroleum Corp. has big production both in the Hendricks and Yates Fields and the Shell corporation is building a 10-inch main line from McCamey to Healdton, Okla. At the latter point this trunk line will intersect the main line system to East St. Louis, Ill. The line is rated as a 30,000-bbl. capacity line.

Shell Corp. has completed its main line system in the field and is moving oil out of West Texas via tank cars. A 6-inch line was built from Yates to McCamey, extended north through the Crane-Upton area and thence northwest to Hendricks.

(Continued on Page 123)

Oil Aided Electrical Development

Utility Companies Established Records in Building Stations and Transmission Lines to Towns and Fields

FORT WORTH, Tex., Feb. 20.—Electrical development in West Texas has been synonymous with petroleum development in that great area. Both have been extensive and represent an investment of millions of dollars. Electricity for the oil fields meant the first electricity for domestic consumption for a great many of the towns in the vast region. A few of the larger towns in West Texas were supplied with electricity by local plants.

Poison gas and extremely bad water conditions have contributed largely to the expansion of the utility in West Texas. With the power available many of the companies used it in preference to other powers.

The utility's vast expansion program has been carried on within the past 18 months. In erecting a generating plant, one company broke a world's record in construction work while other companies showed rapid progress in building lines into the various producing regions.

Big Lake, Pecos, the McCamey district, Church and Fields, Hendricks and World-Powell are among the fields served by the power companies.

Big Lake was the first field to be "electrified" to any great extent. Each well on a large number of leases is being pumped by electrically powered pumps. The deep test in Big Lake, Texon Oil & Land Co.'s No. 1-B University and incidentally the deepest well in the Mid-Continent, is being drilled with electrical power. The well is at present drilling below 7,500 feet.

The motors used in powering drilling wells are especially designed for that purpose. They are heavier for the horse power rating they have and are generally more rugged than the ordinary industrial motor. In addition they are designed with special features to harmonize with the operating requirements. They are so designed that they will operate at 600 or 1,200 synchronous speed at the will of the operator. The slow speed is used for pumping wells and the horsepower rating at low speed is 15 horsepower.

The 1,200-speed with 35 horsepower is used when the wells are being cleaned out, swabbed or when tubing or rods are being pulled. The bandwheel speed can be stepped up to 90 r.p.m. with the proper pulley arrangements.

Two Methods Employed

In drilling, two methods of powering are used generally. One type of electrical drilling is a large single motor with a horsepower rating of 75 to 100. The other is the use of two standard motors with a double rating (15 and 35 horsepower). The advantage of this type motor is that both motors can be connected to the same countershaft. Upon completion of the well one of the motors can be moved to another location and the remaining motor left in place to power the pumping equipment.

Air plants in West Texas are being powered by motors to some extent. Some of the plants are operated for a comparatively short while and their portability is a feature the operators are considering.

Powering of pumping stations on oil lines is another use for electricity. Centrifugal pumping is reported to be satisfactory. The Shell Pipe Line Corp. will power its pump stations on its West Texas line to Healdton, Okla., with motors. Illinois Pipe Line Co. has several electrical pumping stations on its trunk line south from the Yates Pool and will install power units on its trunk line to seaboard. Several other companies in West Texas have equipped their stations in West Texas with electrical units.

Electrically powered wildcats, however, are far in the offing and will have to worry along with highly corrosive water and gas. The cost of extending a transmission line ranges from $2,000 to $5,000 per mile. To extend a line to a wildcat would be entirely too costly. Portable generating plants are not only too costly but are too bulky to handle and they have to be powered by an engine.

Electricity in Demand

In extending their lines into West Texas the utility companies added to the general boom of the country and their load capacity was increased an appreciable amount by domestic consumption. Field camps not only welcomed the advent of electricity but scores of towns without modern lighting joined in the scramble to have distributing lines built. Electrical appliances also gained in favor as their advantages were advertised.

Utility companies have invested millions in extension of lines and building generating plants in West Texas. And in many respects they have vied with the oil industry in doing things rapidly when speed was the essence of the problem at hand.

Record in Construction

Pecos Valley Power & Light Co. is the only strictly industrial electrical company in West Texas and one of the few in the nation. That company's generating plant was built in record-breaking time. The generating plant, a 16,000-horsepower plant, and its miles of transmission lines were constructed and in service in 80 days.

The pipe line departments have their line walkers and the utility companies gain something in common with that branch of the industry with their line walkers. Daily, line walkers go over the various companies' lines and check them to foresee, as far as possible, where line trouble will likely occur.

Continuity of service is one of the strongest claims of the utilities and the line walker's duties play an important part in that service. Trouble shooters, ready to meet any line trouble, are held in readiness at strategic points in order to be available on short notice to remedy any trouble occuring on the line or in the distributing systems. Each company has a reserve unit at the main generating stations to carry on the burden in the event any one unit has to be shut down. Severe electrical storms or windstorms are the most likely to interrupt service and during such the trouble shooters are held in readiness for instant call.

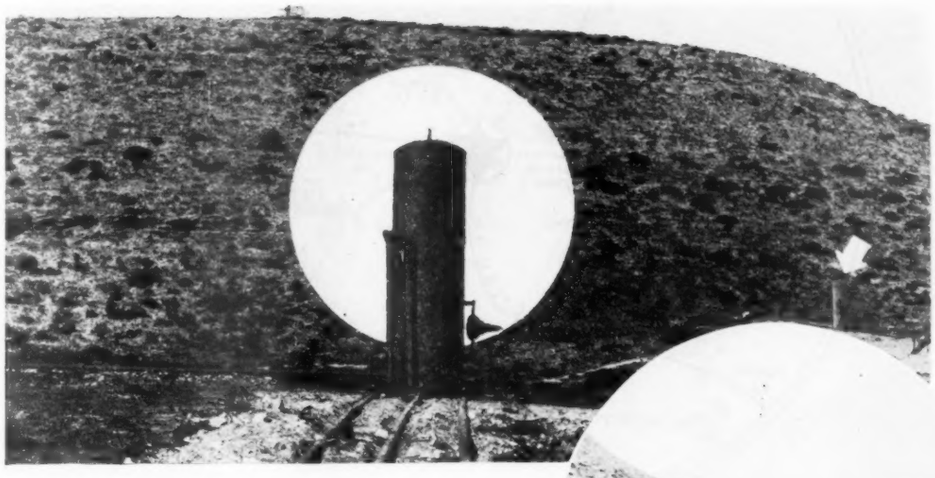
The main transmission lines carry 66,000 volts and the distributing systems carry 13,000 volts. Some of the companies have drawn on the personnel of oil companies for men to study the oil man's problem and have thereby gone a step further in working out the problems as they arise.

Texas Light & Power Co. is the largest utility of its kind in Texas and has extended its already long main lines into West Texas. Its affiliated company, Texas Electrical Service Co., has a transmission system coming out of Eastland and going west generally along the Texas & Pacific Railroad right of way. At Eastland the company has a large generating plant and it has auxiliary stations powered by Diesel engines located at Big Spring, Odessa and Midland. That company's main line goes through the Church & Fields Pool, in Crane County, thence northwest to Monahans and on into the Hendricks Field in Winkler County.

Station at San Angelo

West Texas Utilities Co. has a transmission system coming out of San Angelo where a generating station is located and running into the World-Powell Field in Crockett County. The system reaches into the Yates Field of Pecos County and into the McCamey district where an auxiliary generating station is located.

(Continued on Page 109)



The Pecos County WONDER WELL found the SMITH SEPARATOR on the job

There Are Many More in This Field Handling Flush Production

"FORT WORTH, Tex., Nov. 19.—When the Mid-Kansas and Transcontinental's No. 2 Yates-C in the Yates Pool of Pecos County was opened up for a production test last week and startled everybody by filling all available storage (to the extent of 2,959 bbls.) in the remarkable time of 45 minutes, it created a merry little dispute among writers in the daily press some argumentative com duction men in the field.

The big question und was whether or not this edged to be of phenomen actually produce 65,400 b if allowed to flow steadi

"The entire 5 miles of hills and canyons intervening between the Gulf Production Co.'s No. 3 Yates and the Mid-Kansas-Transcontinental's No. 2 Yates -C is cov ered with wells making more than 100 bbls. an hour on the one-hour test. In fact, only 15 out of a total of 56 wells included in the November 15 proration schedule failed to make at least 100 bbls. en flowed more than 500 g their allotted 60 min- these were good for more during the hour. nobody can state with st what these wells might o flow open for a time. uction is that the water

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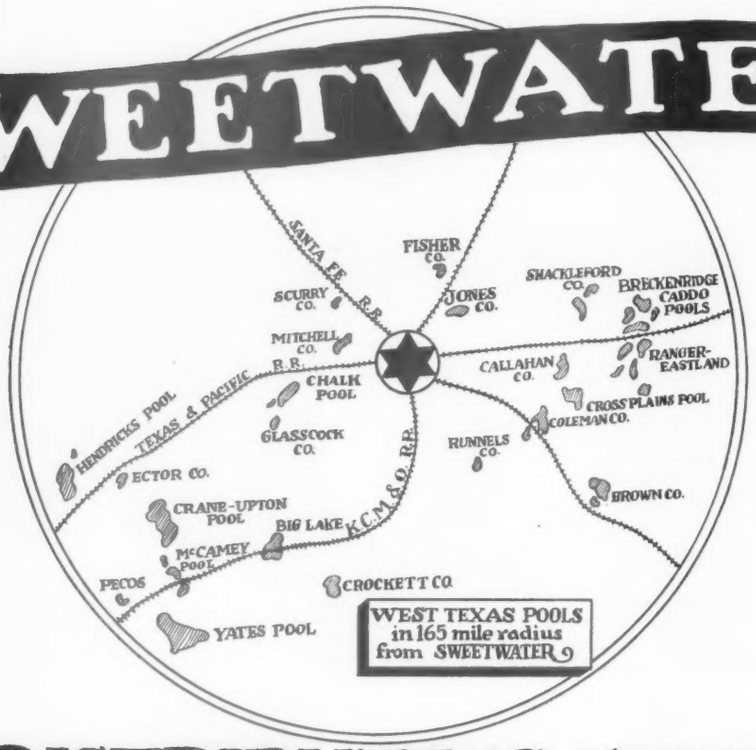
Los Angeles, Calif.

LOUISIANA OFFICE:
405 Forest Ave.,
Shreveport, La.

LONDON OFFICE:
Perkins MacIntosh Petroleum Tool & Boring Co., Ltd.,
25 Bishopsgate
Cable Address:
"Oleborers," London

TEXAS OFFICES:
924 Post Dispatch Bldg.,
HOUSTON, TEXAS
1402 Fort Worth National Bank Bldg.,
FORT WORTH, TEXAS

SWEETWATER



The DISTRIBUTING CENTER of WEST TEXAS

A STRATEGIC SHIPPING POINT

The strategic location of Sweetwater affords the manufacturer, jobber and wholesaler a quick and economical distribution of supplies throughout the West Texas oil fields—shipments from eastern and northern mills are easily attainable over the three railways—the Texas & Pacific, Santa Fe and Orient—and at the "Texas Common Point" freight rate, too, thus eliminating double handling and extra freight charges. It is the most Western point enjoying these low freight rates.

9 BIG REASONS FOR SWEETWATER

Excellent Shipping Facilities

Close Proximity to the Oil Fields

Lower Freight Rates From Manufacturing Centers

Low Electric, Gas and Oil Power Rates

Unlimited Warehouse and Trackage Facilities

Modern Office Buildings

Ample Hotel Accommodations

A-1 Rated Public Schools

Ideal Living Conditions

These are the factors that make Sweetwater an ideal location for manufacturers and distributors.

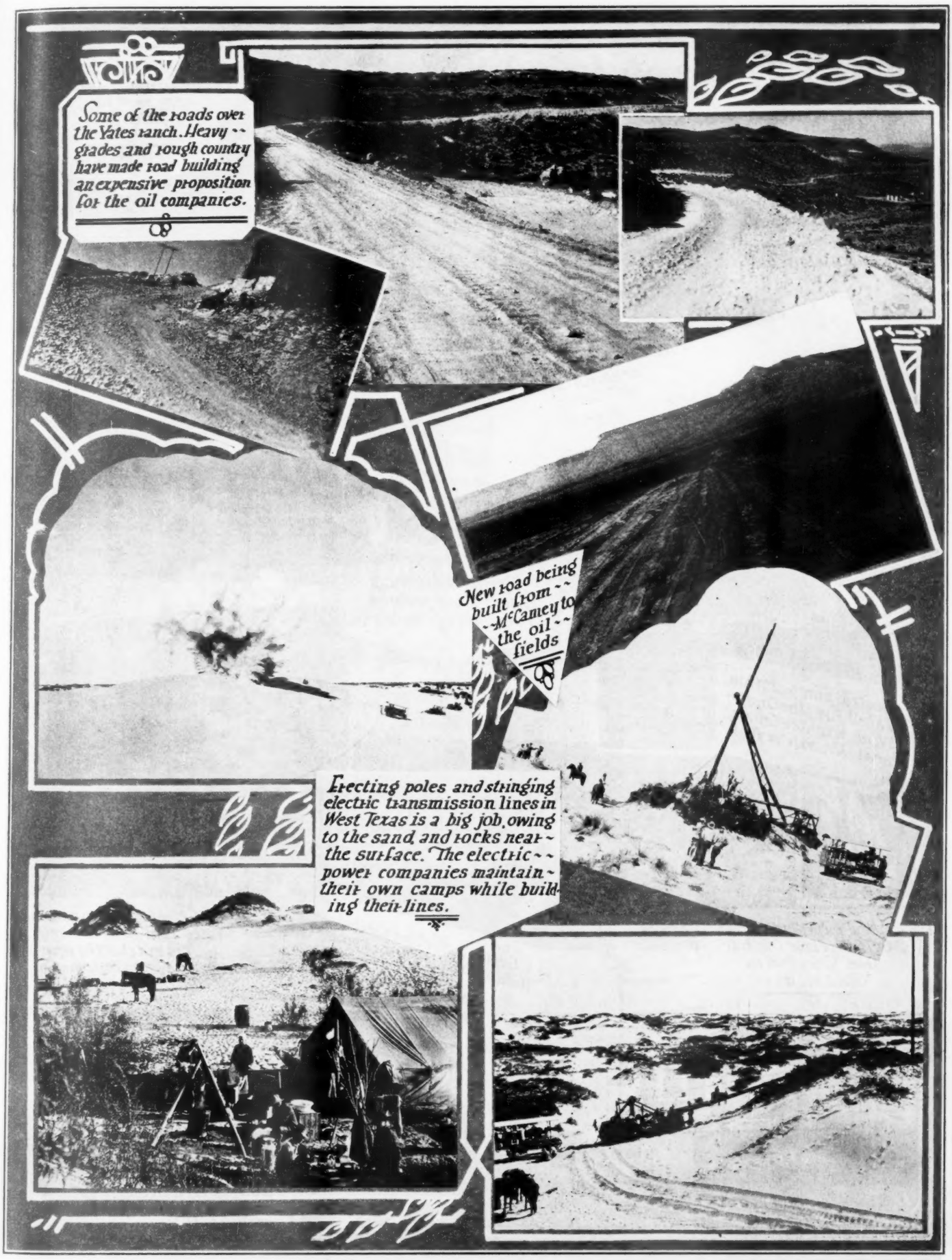
RAIL AND HIGHWAY FACILITIES

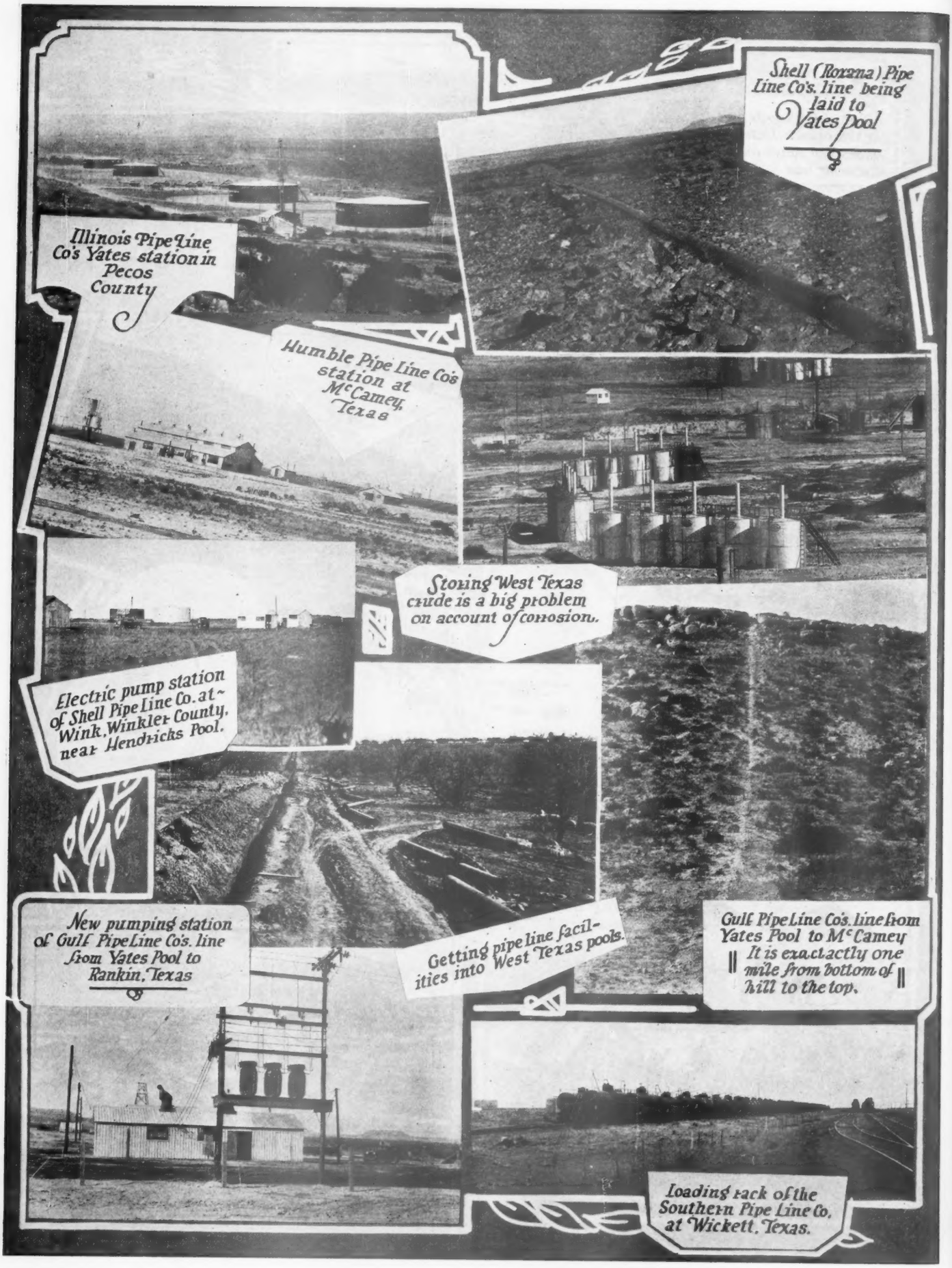
Six railway outlets, radiating into every portion of this vast empire, with their 14 passenger and 16 regular freight trains daily assure quick and economical contact between Sweetwater and ALL West Texas oil fields. Fast motor transportation over six all-weather State highways completes a freight and passenger service into the most remote districts.

Thus are the 25 pools and the 100 drilling wildcat wells constituting the potential oil wealth of West Texas, made directly tributary to allied oil industries locating in Sweetwater.

Additional Information Furnished

BOARD of CITY DEVELOPMENT
SWEETWATER
TEXAS


Some of the roads over the Yates ranch. Heavy grades and rough country have made road building an expensive proposition for the oil companies.
New road being built from McCamey to the oil fields
Erecting poles and stringing electric transmission lines in West Texas is a big job, owing to the sand and rocks near the surface. The electric power companies maintain their own camps while building their lines.


Shell (Roxana) Pipe Line Co's. line being laid to Yates Pool
Illinois Pipe Line Co's Yates station in Pecos County
Humble Pipe Line Co's station at McCamey, Texas
Storing West Texas crude is a big problem on account of corrosion.
Electric pump station of Shell Pipe Line Co. at Wink, Winkler County, near Hendricks Pool.
New pumping station of Gulf Pipe Line Co's. line from Yates Pool to Rankin, Texas
Getting pipe line facilities into West Texas pools.
Gulf Pipe Line Co's. line from Yates Pool to McCamey
It is exactly one mile from bottom of hill to the top.
Loading rack of the Southern Pipe Line Co. at Wickett, Texas.

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FORT WORTH TEXAS MEXIA

Corrosion Big Problem in West Texas

Figuring Life of Surface Equipment at Five Years, Loss From Sulphur and Gas Now Estimated at $7,000,000 Annually

By James H. Dameron

One of West Texas' greatest and most costly problems is that of corrosion, and with the encroachment of water in the three flush fields the problem is growing in importance. At present, it may be said, operators are not as concerned quite as much as they were one year ago because methods are being devised to afford some relief, at least.

It is estimated by some authorities that corrosion will cost West Texas operators $7,000,000 annually. This is based on an estimate that the value of equipment on the surface is around $35,00,000 at the present time.

The surface equipment includes all sizes of tanks and all oil lines in the fields proper. The life of that equipment is figured to be five years. Thus the $7,000,000 estimated corrosion bill is figured. Regardless of what corrosion may or may not cost Permian Basin operators, it is a problem receiving serious consideration.

Corrosive action in Big Lake is being studied by many in attempting to discover a solution to alleviate the problem at hand. That field has been producing since 1923, and, while its crude has a slightly less sulphur content than the other West Texas fields, it affords a good example to work with.

Gathering lines, tanks and low pressure ends of big lines in Big Lake have been the most readily attacked by sulphur. Replacements have been made in the gathering lines and low pressure ends of the larger lines after three years of service.

Gathering Lines Affected

The gathering system in Big Lake is as unique as the field itself. The entire system is one of gravity, and the movement of crude through the line is slow. In parts of the system replacements have been made after three years' service. The lines corrode on the bottom side of the pipe and in some instances the pipe has been taken up and turned over, placing the corroded side on top and the good side on the bottom.

Corrosive properties have seriously attacked the low-pressure ends of the short main-line system out of the field. The 8 and 10-inch pipe at that end of the line has been buried three years, and when it was recently taken up for inspection it was found that approximately 2 miles of that section of the line will have to be replaced in the near fure.

No trouble has been experienced with pumps other than normal trouble with valves. Trouble from that source is not expected to be serious at any time.

Some of the pipe-line men are at present puzzled as to whether corrosion is going to be more costly to gathering lines or to tanks. Tanks are estimated to cost 40 cents per barrel, which would make the cost of an 80,000-bbl. tank $32,000. A tank will last five years, while lines are rated to be good for only three years. The cost of a tank is approximately equal to the cost of 1¼ miles of field line.

The belief is general that the trunk lines will not corrode as rapidly as the field lines. The oil goes through trunk lines at a more rapid speed and will be affected only by a negligible amount of air and water. Another point brought out by one pipe-liner was that the gathering systems in West Texas, outside of Big Lake, would be different. No other field in West Texas resembles Big Lake in topography.

None of the operators expects to wipe out corrosion in tanks but most are of the opinion that a solution will be found to alleviate the trouble in storage tanks. Tank evaporation losses and corrosion losses are closely connected and an experiment to be tried soon is to be watched with interest.

Reducing Tank Breathing

Reducing the tank breathing may be tried by one company soon by connecting two or four tanks to a breathing bag. A wood roof will be used to reduce the expansion and contraction of the oil in the tank. This will also be a factor in retaining the gravity of the crude. Wood roofs and protected bottoms are finding favor with several operators storing crude and those two factors are expected to eliminate considerable tank trouble.

Of the tanks in service for an appreciable length of time in Big Lake, an inspection showed a uniform corrosion and the scale on the deck was from three-sixteenths to five-sixteenths of an inch thick. The inner portion of the scale was composed of iron oxides and was one-sixteenth of an inch thick, the remaining scale was for the most part iron sulphide.

The side walls above the oil level likewise showed a uniform corrosion of the same character that was found on the underside of the roof. Side plates from the oil level down to the b.s. line showed very little corrosion and evidenced the fact that oil itself is not corrosive. The bottom of the tanks, though, were badly corroded in spots. Corrosion on the under side of the top and the walls above the oil level was caused by the condensation of water and sulphur gas. Bottom plate corrosion was the result of galvanic corrosion taking place when scale from the under side dropped down to the bottom.

While corrosion on the bottom plates was not uniform it was deep, and the pits in the plates were comparatively smooth. Rivet heads on the bottom plates occasional'y showed high corrosion. One rivet head was corroded away and part of the shank completely eroded away. It is assumed that the spotted corrosion on the bottom resulted from scale dropping from the tank roof and sifting through the silt and paraffin on the bottom and coming in direct contact with the metal.

The wood roofs are claimed to have an advantage because scale does not form on them and they are a factor in retaining gravity as a result of reducing tank breathing. These roofs must be gas tight for maximum effectiveness to prevent gas from burning the wood. They also must be well grounded to eliminate the hazard of destruction by lightning.

Protective Coatings

Various methods are being emp'oyed to combat the problem in steel tanks with steel roofs. Painting in some form or other is generally used. Protective coatings are placed on the under side of the roof and side walls above the oil line and the bottoms are likewise protected. By painting the exposed side walls and the under side of the roofs corrosion is expected to be arrested to an extent and not only prolong the life of those parts of the tanks but cause less scale to fall to the bottom and set up galvanic action on the bottom plates. What does fall is expected to be largely kept from direct contact with the metal by the bottom protection coating.

In Big Lake a number of tanks are being painted to combat corrosion. The steel to be painted is sand blasted to remove all rust thus permitting the paint to stick properly to the surface. Various makes of paint are used by various operators, but any paint used is one that will not crack with age, one that is elastic and is insoluble to oil and water. The paints are also reasonably gas proof.

Some operators favor the application of a coating of pitch or asphalt to the bottoms. That coating would be approximately 1 inch in thickness and have a water cushion over it to prevent the oil from dissolving the coating. When corrosion did start on the painted roofs the fa'ling scale would be caught by the coating and kept away from the steel. This is not in general favor because of its cost. Painting the bottom and the side walls 18 inches up from the bottom seems to be the most generally used plan of protecting the bottoms.

In drilling, corrosion is eating rapidly into drilling costs. Many operating companies will not use a 4,000-foot drilling line more than once. In numerous instances the life of a drilling line is just its use in the drilling of one well. Such lines cost between $800 and $900.

Many lines appear to be in good condition upon the completion of a well, but so many fishing jobs have resulted from broken lines that operators are wary of using a line more than once. Sulphur gas seems to cause crystalization making the line brittle and it readily snaps in two when tools are blown up the hole a short way. Many fishing jobs have followed when the wells were being drilled in with a line that was a veteran in service.

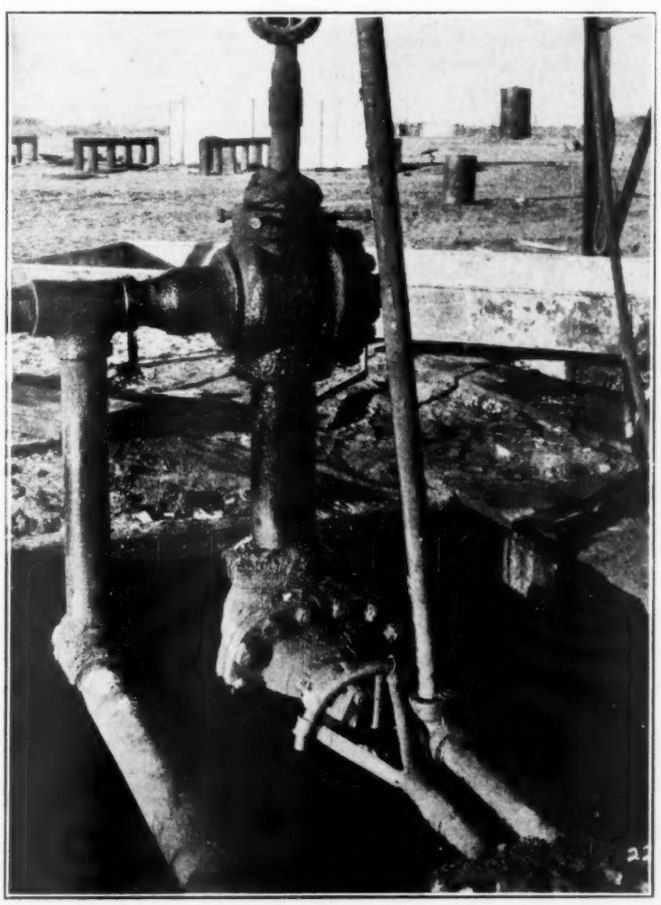
Effect on Tools

Tools, in several instances, have been attacked in the same manner and have snapped in two when subjected to an unusual strain. Defective lines are sometimes hard to detect. Where crystalization sets up, the fine strands will part around a main strand and a line has to be inspected closely to find them. Once crystallization starts, its action is rapid.

Just what general condition casing is in is not known, but corrosion is fairly rapid in wells making water and in wells being produced by air lift. One example is in a well in Crane County. A leak in the casing permitted about three gallons of water to come in and run down the side of the casing to the bottom. The water, apparently, was freely in contact with a 2-inch collar on top of the working barrel. Corrosion started and when tubing was pulled it was found that trenches had been cut in several places around the working barrel. The tubing had not been affected by corrosion to any appreciable extent.

Evidence of rapid corrosion in a well being produced on air lift in the same area was recently found. That particular well had declined to some extent and it was decided to pump it. Previously a working barrel had been put on the bottom joint of tubing so a standing valve could be dropped when one well was put on the pump. This was done and the well

CLEVER DEVICE PERMITS LONG-RANGE WORK



An ingenious method of closing the gate valve has been devised and applied to a well of the Tidal Oil Co. on its University land lease in Crane County. A 3-inch pipe was split four ways and the four prongs fastened to the wheel of the gate valve. The pipe is 150 feet long and extends from the well, permitting a man to shut off the well at that distance. In case of fire, it is not necessary to approach nearer than 150 feet to the well and this device also eliminates the necessity of employes entering the cellar and exposing themselves to poisonous gas.

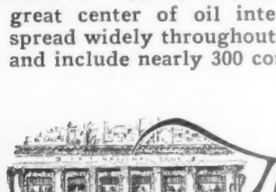
Bankers to the Oil Industry

THE large following among oil men with which this bank has been honored is the result of our long experience and widespread, intimate contact with the development of oil interests in Texas.

A glance over the list of our officers and directors reveals the names of men closely associated with the oil industry, well informed regarding the oil fields of West Texas, familiar with land values and in every way well fitted to render banking service that meets every requirement of this important, growing industry and to the individuals connected with it.

Trust Services For Corporations And Individuals The Trust Department of this bank is equally well fitted to render predominately excellent fiduciary service. Under the direction of one of the ablest experts in trust service in Texas, and adequately manned by well trained specialists, this department fulfils every ideal of trusteeship, executorship, guardianship, agency service, etc. It acts as registrar of stock, transfer agency, and in every trust capacity for individuals and corporations.

At The Gateway To West Texas Location in Fort Worth, the Gateway to West Texas, is an important factor in this bank's usefulness. Fort Worth is indeed a great center of oil interests. This bank's contacts spread widely throughout the oil fields of West Texas, and include nearly 300 correspondent banks.



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pumped several days and quit making oil. Tubing was pulled and it was found that the bottom joint of tubing had corroded badly. This well had been on air lift for about five months.

Corrosive properties in the water of most West Texas areas are so serious that boilers are not used, thereby eliminating steam power. The gas is so highly corrosive that it is uneconomical to use gas engines in several of the areas. The result is that gasoline engines, oil engines or motors have to be used to power rigs. No brass or copper fittings can be used economically and cast iron, steel or galvanized fittings are used. Research work being carried on may eventually solve these problems and permit use of equipment not now generally used.

Crews Are Cautious

The sulphur gas causes crews to use great caution while drilling through it. After coming in contact with the gas, crew members usually wash their eyes immediately with an eye wash solution. If this is done they do not experience any irritation of the eyes or of the mucus membrane in the throat and nose, otherwise painful results follow.

What gas is used domestically from West Texas leases is burned in closed stoves and the sulphur fumes carried away through pipe. One company is an exception. It has installed a patented purification plant to utilize the gas from its leases and is meeting with success while other companies are not having any too good results with type plants.

This particular plant is a Koppers process plant and successfully removes the sulphur from the gas at a cost of around 8 cents per 1,000 feet. Briefly describing the process, the plant gas is circulated through in contact with solution of soda ash which removes 99 per cent of the sulphur. The soda ash solution is revivified by circulating air through the soda ash solution charged with sulphur. The air takes the sulphur out of the solution and carries it off into the air through a 100-foot stack. The treating and revivification process is continuous.

Other operators burn what gas they have no use for. It is piped off a distance from the wells and sent into the air through risers and burned. If it was not burned atmospheric conditions might bring it down to low places in the fields and take a toll in lives of inhabitants in the leases. Several deaths have resulted from poison gas in the fields and considerable loss has resulted from stock being killed. Burning of the gas in the Church and Fields Pool is an impressive spectacle at night. On a cloudy night the reflection from the burning gas on the sky has been witnessed from such a distant place as Big Springs, which is about 100 miles to the northeast.

There are records of gaugers being overcome by poison gas in tanks, some falling in the tank of oil and others falling to the side of the tank. Isolated accidents of gaugers falling through a badly corroded tank top also have been reported.

As a result of such accidents the poison gas has developed the "swamper" in some sections. He serves as a safety man for the gauger and both are equipped with gas masks. The gauger goes about his duties while the "swamper" remains on the fire wall to render assistance in case of an emergency. If the gauger's mask leaks the "swamper" is there to give artificial respiration. It required a gauger about 30 minutes to work a battery of five or six tanks.

Corrosion at the rate of $7,000,000 per year may or may not be a high figure for West Texas. Oil lines may not corrode as rapidly as is estimated on the basis of corrosion costs in the Big Lake Field. But corrosion in tanks is expected to be rapid when the water situation grows more serious. Heat and agitation in connection with water accelerates corrosion, as has been pointed out, and the next six months may reveal several interesting developments in research. Those making the estimate that $7,000,000 will represent the annual corrosion bill do not consider the damage being caused to drilling lines, tubing, sucker rods and casing.

One of the interesting tankage programs in West Texas is that of one company which is building two 1,000,000-bbl. concrete tanks. Tank sites will be excavated and concrete walls built.

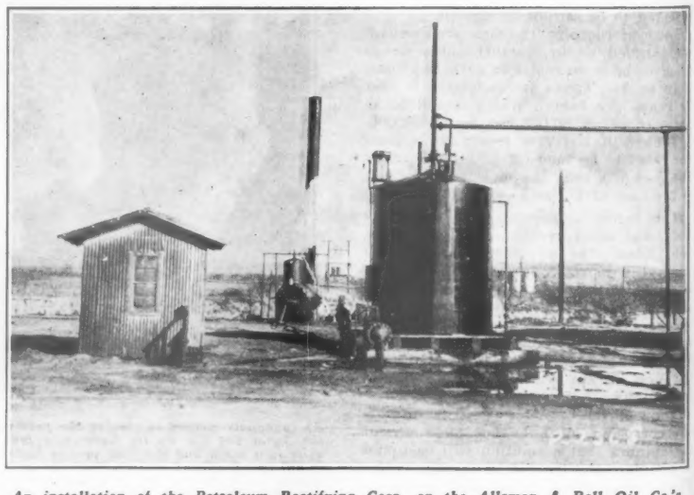
CONCRETE UNDERGROUND TANKS FOR WEST TEXAS

SAN ANGELO, Tex., Feb. 20.—Concrete underground oil storage tanks which Shell Pipe Line Co. is building in West Texas—the first at Monahans, in Ward County—will be elliptical in shape, 524 feet long, 504 feet wide, 36 feet from roof to floor at the center and 25 feet high at the eaves.

Aluminum nails will be used in building the roof. The remainder of the tanks will be made of specially treated concrete. Each tank will have a 4 per cent carbon dioxide content in the space above the oil and a roof vent. Gases escaping through this vent will be removed a safe distance and burned. A system of lightning protection will be used, with six 150-foot towers.

Each tank will have a capacity of 1,000,000 bbls. and will cost $250,000. A second tank is planned for McCamey, in Upton County. Steel storage costs about 50 cents a barrel, but has a higher salvage value because they may be moved.

TREATING PLANT IN YATES POOL



An installation of the Petroleum Rectifying Corp. on the Allsman & Bell Oil Co.'s riverbed production in the Yates Pool.

On Well Casing

Typical Service Reports from the Dearborn Field Service Staff

"The casing in well No. 21 on ———, which was treated with NO-OX-ID 'A-Special,' is still working. This is 1500 feet of 6¼ inch casing and it is now 2½ years since the NO-OX-ID was applied and it is still going good. The last string of 6 inch casing in this well prior to using NO-OX-ID lasted but 20 months. It is needless to say that Mr. ——— is well pleased."

* * * *

"Mr. ——— recently inspected a string of tubing in Well No. 16,——— Lease that he coated with NO-OX-ID 'A' 3½ years ago and found it in perfect condition.

"The well pumps five barrels of oil to 80 barrels of water per day. He feels that use of NO-OX-ID on tubing will increase life of same 50% or more, and he will dip all tubing in the future."

* * * *

"Mr. ——— is very well satisfied with the NO-OX-ID 'A' Special he has used on casing, tubing and pipe line. He pulled casing coated with 'A' Special that had been in the well over a year and it was in perfect condition. Casing not coated, in service that long, is always much rusted. They have a creek crossing here, sulphur water, which they renewed every year. The last time it was renewed, about two years ago, it was coated with 'A' Special and they have had no trouble with it since."

[Names on Request]

Use of NO-OX-ID is being extended rapidly to preservation of well casing. Have you used it there and on cables and control casing heads?

In reconditioning casing or pipe lines, do not overlook the fact that NO-OX-ID will chemically stop the pitting that has started.

Dearborn Chemical Company

310 South Michigan Ave., Chicago **299 Broadway, New York**

"A House of Chemical Engineers" In Its Fortieth Year of Service to Industry

Canadian Offices and Factory: 2454-2464 Dundas St., West, Toronto

If you are likely to be in a position to recommend or use a Rust Preventive, run a test now, or investigate NO-OX-ID.

NO-OX-ID

IRON + OX = RUST

TRADE MARK

The Original Rust Preventive

—and you too, will l
ABILENE Th

Exceptional Home and Business Advantages

Countless numbers, with no local business connections, but with interests in various points of the Southwest, have selected Abilene as their residence because of its livability, congeniality, conveniences and comforts. It is an often-heard expression that "People Love to Live in Abilene."

The educational advantages available in Abilene are among its major attractions. Thousands have located here to be near one of the institutions of learning in the city. Simmons University, the only school of that grade in West Texas; Abilene Christian and McMurry, two of the outstanding senior colleges of the state, together with two business colleges, a parochial academy and one of the most efficient public school systems of the Southwest enroll annually over 10,000 students.

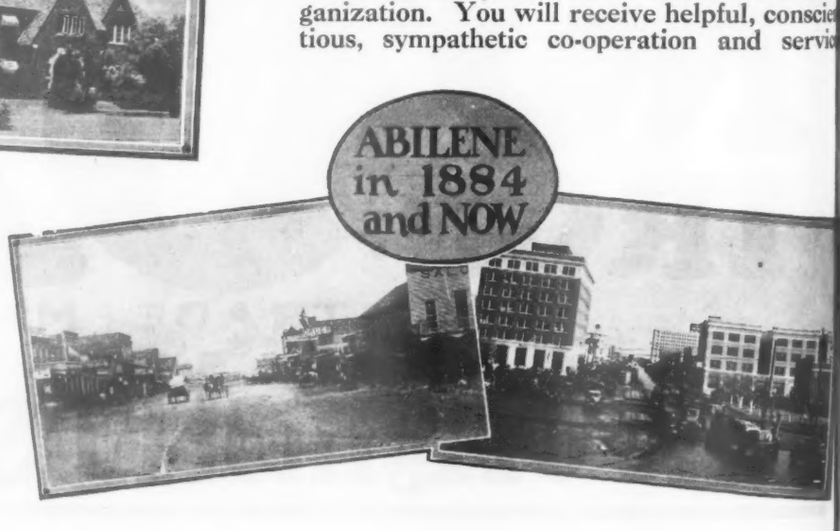
An atmosphere of culture and refinement seldom encountered has come in the wake of the schools of this city. Life in Abilene is not confined to narrow, uninteresting routine. Beneficent pleasures are obtainable at country club, golf courses, pleasure resorts, lakes, bathing pools and theatres. A well-stocked public library and a score or more magnificent churches are here.

Over 38 miles of paved streets, plenty of pure water, adequate sewer lines, natural gas for all uses, electric street railway and bus service and unlimited electric energy are a few of the conveniences awaiting you in Abilene.

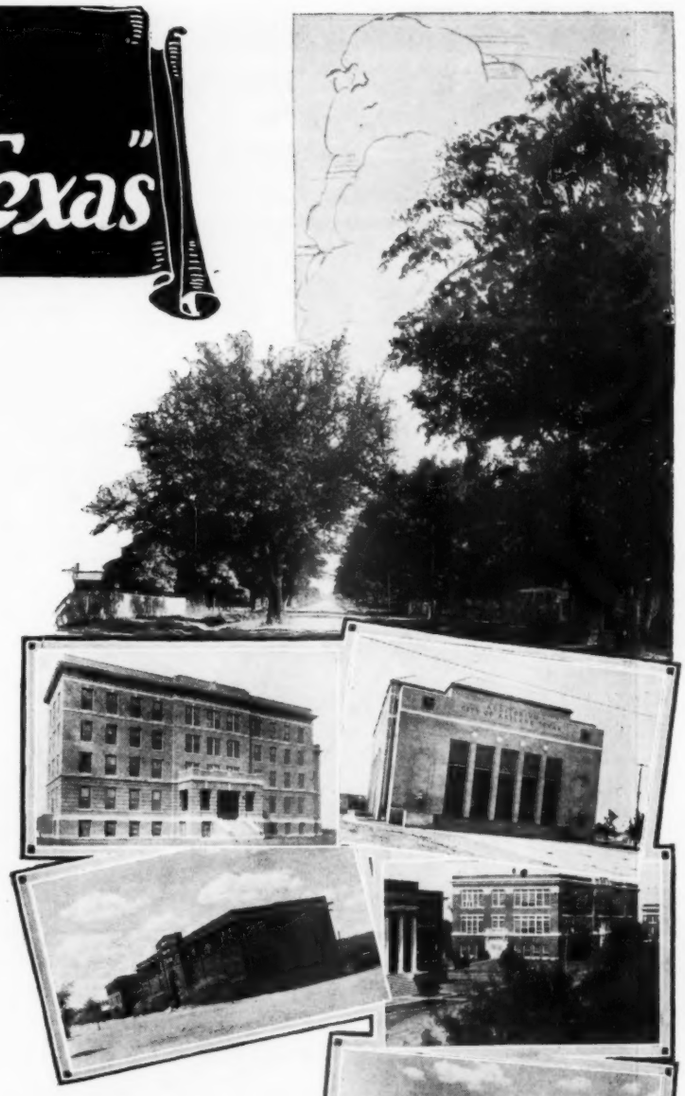
Visit Abilene—

Meet her happy, contented, progressive citizens —See for Yourself!

Communicate your wants or needs to this organization. You will receive helpful, conscientious, sympathetic co-operation and service



love to live in "The Capital of West Texas"



It Is Ideally Situated for All Interested in West Texas Oil Activities

Abilene, as shown by the accompanying map, is in the midst of the West Texas oil fields. Both the Central West Texas pools and the Permian Basin areas are easily and quickly reached from this city.

Standard highways go out in each direction. Seven motor stage lines operate between Abilene and neighboring cities, giving convenient access to all oil developments in the Southwest. A drive of less than eight hours is required to reach the farthest removed parts of the Pecos and Winkler fields.

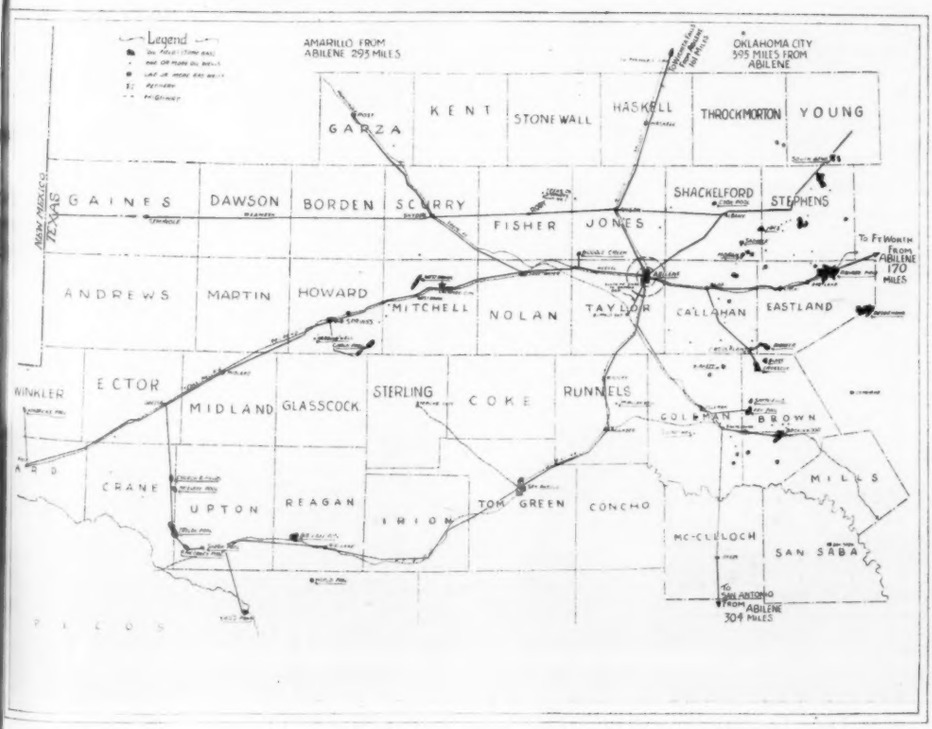
Direct rail connections into all the fields of West Texas are available out of Abilene. Sixteen passenger trains pass through the city daily. Schedules are such as allow much time conservation.

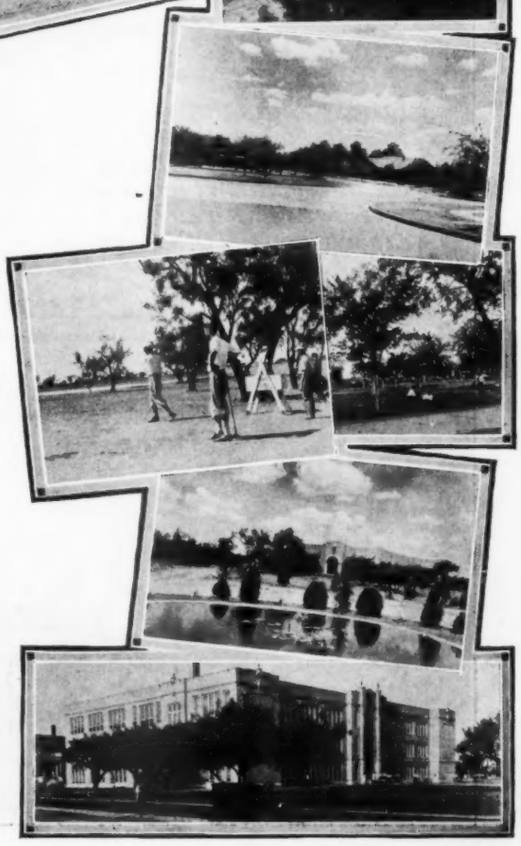
Since the days of the Ranger boom Abilene has been serving oil men. A larger number are now availing themselves of the advantages here than ever before. More than a score of important oil companies maintain headquarters and hundreds of independents have homes and offices in this city.

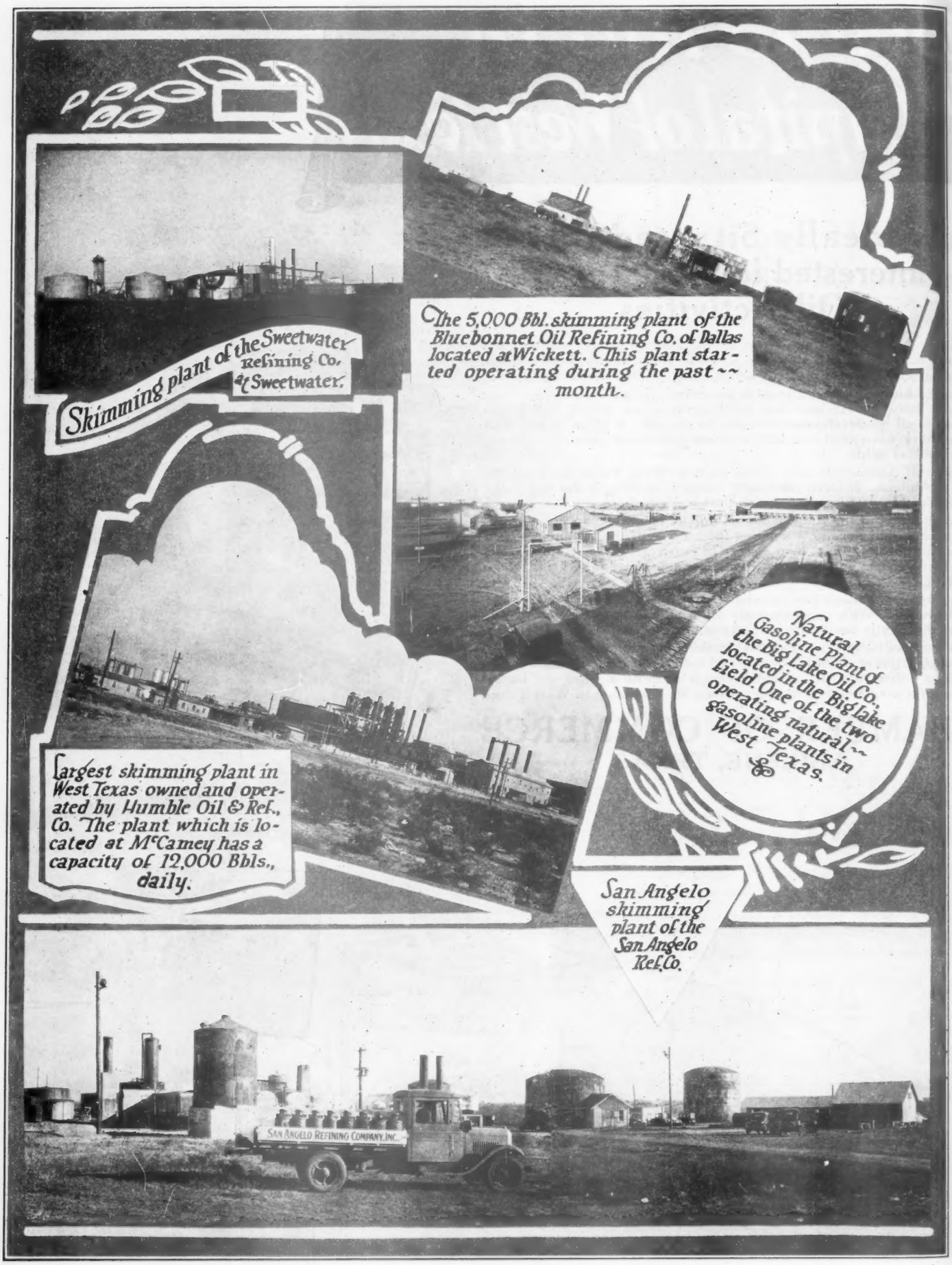
Population of Abilene has increased from 10,274 in 1920 to more than 32,000 today. With approximately 90 wholesale houses and 70 factories this city is the industrial and commercial center of West Texas.

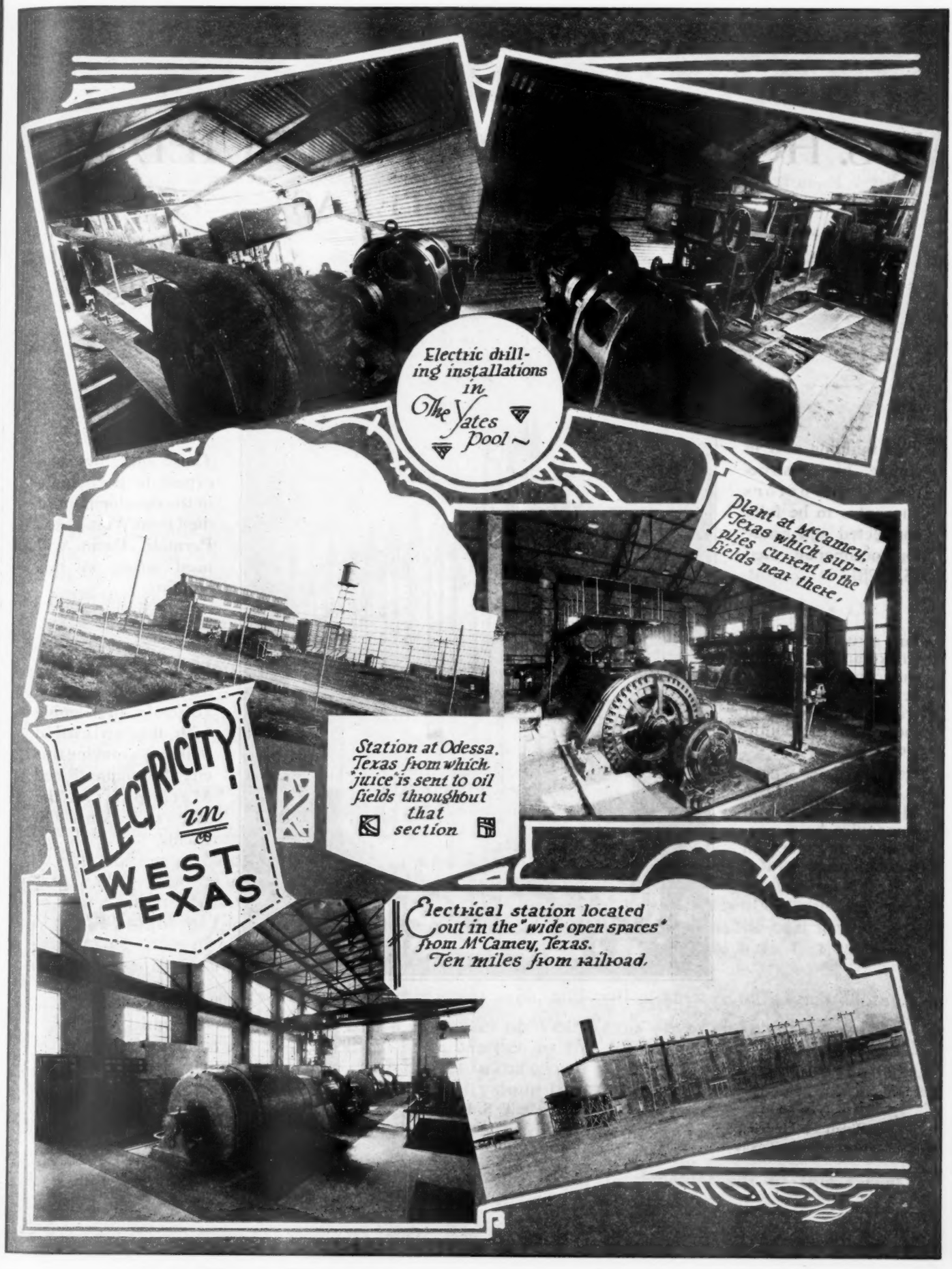
Modern office buildings, substantial banking facilities and a friendly, interested, helpful citizenship--combined with its strategic location--make Abilene outstanding in its attractiveness to those seeking the logical place for a permanent or temporary base for operation in West Texas.

CHAMBER OF COMMERCE
ABILENE, TEXAS






Skimming plant of the Sweetwater Refining Co. at Sweetwater.
The 5,000 Bbl. skimming plant of the Bluebonnet Oil Refining Co. of Dallas located at Wickett. This plant started operating during the past month.
Natural Gasoline Plant of the Big Lake Oil Co., located in the Big Lake Field. One of the two operating natural gasoline plants in West Texas.
Largest skimming plant in West Texas owned and operated by Humble Oil & Ref., Co. The plant which is located at McCamey has a capacity of 12,000 Bbls., daily.
San Angelo skimming plant of the San Angelo Ref. Co.
SAN ANGELO REFINING COMPANY, INC.


Electric drilling installations in The Yates Pool
Plant at McCamey, Texas which supplies current to the fields near there.
ELECTRICITY in WEST TEXAS
Station at Odessa, Texas from which "juice" is sent to oil fields throughout that section
Electrical station located out in the "wide open spaces" from McCamey, Texas. Ten miles from railroad.

T. S. HOGAN PETROLEUM BUILDING
MIDLAND, TEXAS

This building now in course of construction. Contractors guarantee to be fully completed and ready for occupancy Oct. 15, 1928.

* * *

In architecture, workmanship, material, conveniences and details this building will be the equal of the best in the Southwest.

* * *

Many of the major oil companies have contracted for space in this building.

Those operators who expect to participate in the development of the Great West Texas Permian Basin will need space in this building.

* * *

Midland is building hotels, homes and schools in keeping with this splendid building—making this city the unquestioned Metropolis of the West Texas Oil Fields.

Architect
Wyatt C. Hedrick
Fort Worth, Texas

T. S. Hogan
Owner
Midland, Texas

General Contractors
Hickey & Harrington
Dallas, Texas

MIDLAND, TEXAS

The Metropolis of the Great West Texas Permian Basin—the most important oil area in the world today.

In 18 months this Basin has developed the greatest potential daily production of crude ever known to the industry.

Yates Pool, in Pecos County
Church-Fields-McElroy Pool, in Crane and Upton Counties
Hendricks Pool, in Winkler County
McCamey Pool, in Upton County
Gulf-Waddel Pool, in Crane and Ector Counties
Cosden-Connell Pool, in Ector County
Roxana-Llano-Scarbauer, in Winkler County
Texas-Rhoades, in Southeast Lee County, New Mexico
The newly discovered pools in Howard County
And scores of other pools as yet undiscovered are all within a 90 mile radius of, and tributary to

MIDLAND, TEXAS

These oil fields are of such tremendous importance that they are today the dominant factor in the oil industry of America. Fortunately for the oil industry, the most of these fields are so owned, controlled and intelligently operated that their development will extend over a long period of years.

The pipeline system already built or building to serve these fields calls for an expenditure well in excess of $100,000,000.00, and that amount will be doubled in pipeline expenditures during the next two years.

Midland is ideally located as headquarters for all of the companies whose interests are not confined to any one field. It is in almost the exact center of this immense oil area, with good roads leading to all of the fields.

Midland County has already begun a system of road construction designed to provide the best possible roads in the most direct routes to each of these fields, and with the cooperation of the adjoining counties it will soon be possible to reach every one of these fields over a good hard-surface highway.

The citizens of Midland are building a substantial and permanent city. Every building being constructed is of the substantial and modern type. Its schools system is being expanded in anticipation of the city's growth, and the new homes being built in the city, as well as many of the older ones, will compare favorably with homes in the best residence areas of cities of 100,000 people and more. The new Scarbauer Hotel is the last word in hotel equipment and service.

Midland is the wholesale center of this great area, and will always remain such center.

Midland has always been the livestock center of West Texas—ever since the days when the great herds were trailed North from Mexico to the farthest Northwestern points. More wealthy ranchmen have their homes in the city of Midland than in any other city of its size in the Southwest, or even of any city four times its size. These ranchmen, in addition to their profitable livestock business, are now the holders of extremely valuable oil royalties. The annual lease rentals paid by the oil companies to residents of Midland is in itself a very sizeable income.

If you want to participate profitably and without risk in the development of this Great West Texas Permian Basin, buy real estate in the city of Midland.

Petroleum Will Develop New Empire

Based on the History of the Industry, West Texas Is In for Half Century of Oil Activity. Oil's Trail of Wealth

By James McIntyre

How long will it take to develop the oil possibilities of West Texas?

When an oil man refers to West Texas he has in mind all the territory west of the line bordered by Wilbarger, Baylor, Throckmorton and Shackelford Counties, and all the territory from the Panhandle south to the Rio Grande River, excluding the Southwest Texas Fields, which lie near San Antonio and southerly. It is a tremendous sweep of country. It is, say, 360 miles from east to west at its greatest width and nearly 300 miles at its greatest length north and south. The writer will not hazard a guess offhand on the acreage contained in this territory, but that it is more than 50,000,000 acres in extent is sufficient for our purpose. Of this, about 12,000 acres is producing oil. Now, 12,000 acres is only .02 per cent of the whole territory even if we confine the area to a modest 50,000,000 acres, and if that alone is not sufficient to show the reader how little of this West Texas empire has been developed as an oil region we can use another way of showing how much territory there is to work in by stating truthfully that all the oil wells in the United States could be placed within the confines of Pecos County alone, giving each well 5 acres of space. When you look at a map of West Texas, Pecos County, big as it is, forms only a small part of the whole territory. You could lose New England in West Texas. You could lose old England in it, too, for that matter. It is so big it staggers the imagination of any but a Texan.

Progress Already Notable

And there it lies waiting for the hand of man to develop its magnificent resources. The cattle man pioneered but did not get very far in developing it and in building cities and towns. Now the oil man has taken up the job started by the cattle man and is making more progress. Railroads which have occasioned as many jokes as Henry's Lizzie are on the way to their greatest prosperity. Towns have sprung up in profusion where there was naught but sand and sagebrush, dust and desolation. Perhaps one going out to West Texas for the first time might not be able to appreciate that what he sees is progress. He must have lived there and known the country as it was, say, two years ago to mark the change. It is freely admitted there is vast room for improvement, but that is the basis of this story.

West Texas as an oil country is what interests us. When the big territory has reached its peak as an oil region, it will have arrived at a point where important cities and towns, thousands of farms and gardens and an army of men, women and children will have been added to what is now just land. That has been the history of oil since 1859. The tremendous amount of money distributed through an oil region in production, royalties, salaries and wages forms the capital that maintains industry even after the oil flush has been exhausted and the region becomes known as a field of settled production.

Just Beginning as an Oil Country

The enormous territory covered by the West Texas division of the Mid-Continent Field produced nearly 79,000,000 bbls. of crude oil up to December 31, 1927. At the rate it has been producing this month, it will exceed 100,000,000 bbls. this year and all from a few scattered pools that are an infinitesimal part of the general area. It appears to be one of the greatest producing divisions. Estimates of the ultimate production of the area are many and they represent a wide speculative scope. That the already known pools will produce over half a billion barre'ls of oil is the opinion of one of the leading oil executives.

How long will it take to drill up the territory is a natural question. Based on past experience in other areas, it might be said that it will take between 50 and 100 years. The oil business is not yet old enough for one to be able to say how long it takes to thoroughly test a territory even as small as 2,500 square miles (1,600,000 acres). Operators are still drilling oil and gas wells in the Venango-Clarion district in Pennsylvania, which is an oil country 68 years old. Kansas in 1927 produced over 17 times as much oil as in 1907, when the field was 19 years old; and Oklahoma in 1927 produced six times as much as it did 20 years previously when the Glenn Pool was at its height and 19 years after the State began to produce oil in commercial quantity.

What Other Regions Show

The Pennsylvania-New York division in 1927 produced more oil than it did in any year since 1904, and the field was opened by Colonel Drake in 1859 and reached its peak in 1882 with a total of 30,053,500 bbls., an average of 84,081 bbls. per day. The area is producing 34,000 bbls. a day 46 years after its peak year.

California last year produced five times the amount of oil it produced 20 years before, and then the field had been in the process of development since the late 60's and was an important element in world production.

The above records of other producing divisions are presented to those interested in the petroleum development of West Texas so that even the inexperienced in oil may grasp the fact that the prosperity brought to a part of the country where oil exists is not ephemeral.

Reducing the application of the facts to cities, the old oil towns of Oil City, Bradford and Olean in the Pennsylvania-New York division may be cited. They are larger and wealthier towns now than they ever were, but their foundation was laid on a structure of petroleum and they are still regarded as eastern oil centers. Bartlesville, Okla., grew from a few huts to a city of 20,000, but when its oil boom subsided it was a town of 6,000 or 8,000. It continued to grow after the rush of transients to newer fields. Ardmore, Enid and Okmulgee, Okla., and Independence and Eldorado, Kans., regional oil centers where the boom days are history, are prosperous, growing cities where oil men make their homes and business headquarters. Mushroom towns strung along country roads in oil fields in many states have been built and later deserted, but the cities that have been the centers of oil-field development in whatever state have been permanently benefited by the petroleum development surrounding them. The oil business gave them a start, left fortunes in royalties and rentals to outlying farmers and local residents and built cities so well that they have been attractive to other industries. For that reason they continue to grow and to increase their prestige in their general locality.

Current records of field development in the Mid-Continent give us a line on how

West Texas Refining Expanding

Six Plants Now Operating With Two More Under Construction. Total Capacity Exceeds 40,000 Bbls. Daily

By C. O. Willson

When the construction programs now under way are completed West Texas will have a rated refinery capacity of 43,500 barrels daily at nine plants.

That area, which compares in size with some of the largest states in the Union, up to two years ago was dependent on refineries located in other sections of Texas for the bulk of the refined products it consumed. Its output now exceeds the local demand and it has become a factor in the national distribution of petroleum products.

The development of refining in West Texas closely followed the activity in the crude oil production end. The large supply of crude oil assured the refiners an adequate supply of raw material and this situation apparently will continue a long time in the future.

Several difficulties confronted the refiners who chose to locate plants in West Texas. In the first place the bulk of the crude oil coming from the several fields is relatively difficult to refine into finished products. This is due both to the low gravity and the presence of sulphur compounds and other impurities. In the beginning several operators found it practically impossible to manufacture gasoline and kerosene meeting the usual specifications. The impurities in the crude oil brought a major operating problem in the corrosion of distilling, fractionating and condensing equipment.

These manufacturing problems are gradually being solved by the operators through the design of special equipment and improved treating methods. Refinery costs, considering the yields of finished products, are still relatively high but this has been offset by low posted prices at the wells.

The first refiners in the field also were faced with exceptionally high freight rates to consuming points. Railroads have co-operated in ironing out some of these obviously unfair rates and additional adjustments will no doubt be made. Some of the operators have had difficulty providing their plants with an adequate and pure water supply.

*REFINERIES IN WEST TEXAS

Name of Company, general office address—	Plant Capacity Bbls. Daily	Plant Location
Bluebonnet Oil Refining Co., Dallas	5,000	Wickett
Col-Tex Refining Co., Oklahoma City	8,500	Colorado
Humble Oil & Refining Co., Houston	12,000	McCamey
Pasotex Petroleum Co., El Paso, owned by the Standard Oil Co. of California. Plant under construction	10,000	El Paso
Rio Grande Oil Co., Los Angeles	3,000	El Paso
San Angelo Refining Co., San Angelo	2,000	San Angelo
Sweetwater Refining Co., Sweetwater	1,000	Sweetwater
Valley Refining Co., Pyote (under construction)	2,000	Pyote
Total capacity	43,500	

*Operation of all plants confined to skimming and topping.

Market Outlets

Although sparsely settled, the West Texas area has furnished a larger local outlet for refined products than had been expected. The railroads crossing the West Texas area are taking large quantities of fuel oil. Local industries and public utilities also are large buyers. The competitive fields, such as coal and gas, are not generally available.

The irrigation district of West Texas is absorbing large quantities of gasoline, kerosene and the heavier oils. Tractors are widely used in farming. A few of the

(Continued on Page 114)

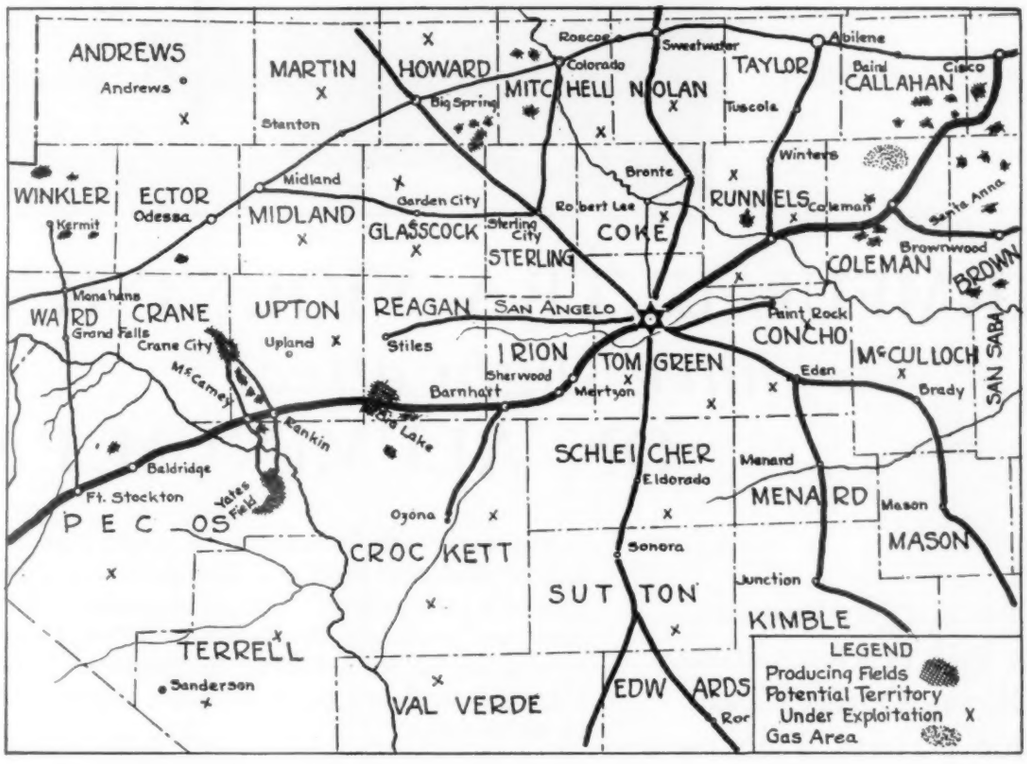
Data Showing Sources of Samples and Some of the Figures Indicating Physical and Chemical Properties

Sample No.	Field	Sand	Depth feet	Properties of Crude: ° A.P.I.	% S	Viscosity at 100° F.	Pour Test ° F.	Gasoline Fraction: %	° A.P.I.	Viscosity at 100° F. of Vacuum Fractions: 225-250	250-275	275-300	% Carbon Residue of Residuum
27,866	Big Lake	Permian Lime	2,900-3,100	38.2	0.36	41	(*)	32.8	59.5	66	105	200	4.6
27,856	Chalk	Chalk	1,770-1,800	32.1	.84	69	50	25.0	57.2	60	89	155	12.0
27,858	Chalk	Chalk	1,600-1,630	31.3	.91	63	35	23.7	56.2	61	91	145	12.5
27,857	Chalf	Porous Limestone	2,956-2,990	26.8	2.02	66	25	21.2	54.9	63	97	180	13.9
27,860	Church and Fields	Permian Lime	2,900-3,200	31.1	2.69	50	(*)	26.8	57.4	62	100	180	12.0
27,861	McElroy	Lime	2,800-2,900	33.0	2.42	51	(*)	27.0	57.9	61	93	175	11.3
27,862	McElroy	Lime	2,800-2,900	32.8	2.40	47	(*)	26.6	57.4	65	100	180	11.2
27,863	McCamey	Lime	1,800-2,300	24.5	2.29	110	(*)	14.5	50.9	70	125	230	11.7
27,864	McCamey	Lime	1,800-2,300	25.6	2.23	104	(*)	15.8	54.9	76	135	270	12.3
27,867	World	Lime	2,500-2,700	29.7	0.59	80	35	18.8	54.7	69	110	200	5.8
27,859	Hendricks	Lime	2,700-3,100	30.0	1.53	56	(*)	22.7	57.7	76	135	270	8.5
27,865	Yates	Lime	1,000-1,500	30.6	1.61	59	(*)	22.2	56.4	73	125	270	11.6

*Below 5 degrees Fahrenheit.

San Angelo

West Texas Oil Capital



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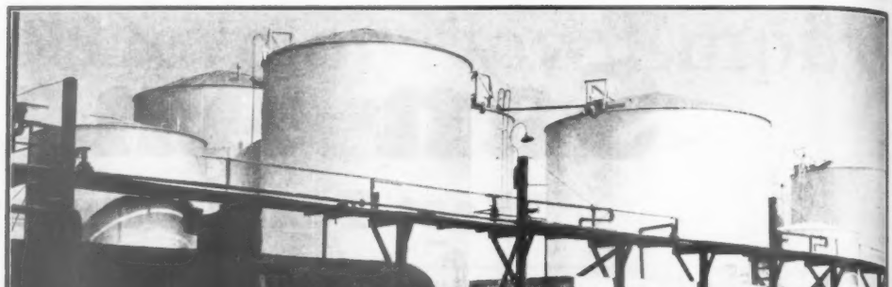
Largest City Between Fort Worth and El Paso
$4,000,000 Building Program for 1928

San Angelo Board of City Development



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Bitulumin is largely immune to this attack because it offers to the sun's rays an aluminum armor which turns away 86% of them.

In turning back destructive light and heat rays, Bitulumin makes a cooler surface, and in the case of tanks reduces evaporation.

Bitulumin, while extremely popular for painting oil storage, is not limited to that field. It is a many purpose paint and has demonstrated its unusual qualities for painting tanks, tank cars, refinery equipment, metal buildings and roofs, smoke stacks, steel bridges and many others.

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long it takes to develop favorable-looking acreage within the borders of so small division of land as a county.

Even though drilling activities in Creek County, Oklahoma, date back over a quarter of a century, and notwithstanding the county has produced several hundred million barrels of oil from the Glenn, Cushing and Greater Bristow Fields and scattered pools, the search for oil in new spots in the county goes on to such a degree that at this time when field work is at a low ebb there are 61 drilling wells scattered through 23 of the 34 townships in the county. Of the total number of wells drilling, 30 are being drilled on leases that have not heretofore been given a test deep enough to have found production.

In Osage County, Oklahoma, where the first well was drilled in 1896, or over 31 years ago, there are at this time 61 wells classified as drilling, of which 18 are the first tests on as many quarter-section leases. While Osage County is believed to have seen the last of its big pools, there are many hundreds of quarter sections which have never known the drill, and without doubt there is much undiscovered oil in that big region of 1,500,000 acres.

Okmulgee County, which was a busy field as far back as 20 years ago, is still being gone over by wildcatters and semi-wildcatters, and at the time of the 41 wells drilling in that county 17 are being drilled on heretofore undrilled leases. Okmulgee has been a large producer of oil. The first of the big Wilcox sand pools was found in that county in 1918. The production of the county has been slowly declining in recent years, but this fact does not stop the search for and discovery of new producing spots.

The discovery of oil in Rogers County, Oklahoma, dates back to the late eighties, and the first well in Tulsa County, Oklahoma, was drilled about 1891, yet after all the intervening years and after all the thousands of wells that have been drilled in the territory including Rogers, Tulsa, Wagoner and Muskogee Counties, operators are drilling 44 wells, of which half bear the serial number 1, indicating that they are the first wells on undeveloped leases.

The Butler County Field in Kansas, which has produced over 207,000,000 bbls. of oil in the past 15 years, is yet the scene of semiwildcat operations. Of the 14 wells drilling in that county 11 of them are No. 1 wells. Cowley County has 22 wells drilling, of which 19 are No. 1. Cowley has been subjected to test work for 15 years or more, but there appears to be plenty of undeveloped acreage which looks good enough to warrant a heavy expense for tests. The Greenwood County Field, which has been a large producer since 1918, is the scene of 32 drilling operations, of which 15 are No. 1 wells. Marion County has 22 drilling wells, of which 18 are No. 1 wells on outlying leases.

Record of Central Texas

When we go into the Central Texas area, which has been a busy territory since the Ranger excitement, we find 375 drilling wells, of which 242 are No. 1 tests. Brown County shows 43 No. 1 drilling wells out of a total of 49 drilling; Callahan, 18 out of 22; Coleman, 42 out of 46; Eastland, 25 out of 37; Jones, 9 out of 9; Palo Pinto, 12 out of 17; Runnels, 12 out of 13; Shackelford, 14 out of 35; Young, 22 out of 53. In some of the counties yet classed as wildcat, all the wells are No. 1, or first drilling wells on undeveloped leases.

After all the years of development to which Kansas has been subjected, 211 new leases were found productive of oil last year; 260 leases in 1926; 258 in 1925; 162 in 1924; 183 in 1923; 223 in 1922, and 206 in 1921. It will be noted that there were more new leases developed last year than six years before, showing there was no letdown in the possibilities of oil in the State.

Seven-Year Record of New Leases

Moving into Oklahoma, where the first well was drilling 40 years ago, we find that last year 734 new leases were found to be productive of oil; in 1926, 637 leases; in 1925, 850; in 1924, 842; in 1923, 978; in 1922, 1,034, and in 1921, 1,000.

From the foregoing the man interested in West Texas may get an idea of what the future has in store for that region. That operators will be drilling for oil in West Texas in 1978 is assured, if such a product as petroleum is needed by mankind in that distant period. That meanwhile a meagerly populated land will have been converted into a closely settled region of prosperous cities and towns, ranches and farms, with vastly improved railroad and highway facilities, goes without saying.

Every part of the United States in which oil has been developed in considerable quantity has been tremendously benefited by such development. West Texas will receive its share of benefit and that share should be a large one.

OIL FIELDS SPURRED ELECTRICAL EXPANSION

(Continued from Page 90)

The company's main line system goes north out of McCamey to a point near Crane City, where it ties into the Texas Electrical Service Co.'s system.

Texas-Louisiana Power Co. has a generating station at Pecos which extends east to Barstow and thence north into the Hendricks Field. That company is at present constructing a 2,000-horsepower unit at Wink in the Hendricks Pool. That company, likewise, has a strong system in the new oil region.

Pecos Valley Power & Light Co. has its main generating station on the Pecos River in the northeastern corner of Crockett County. The station is a 16,000-horsepower station and at present another 8,000-horsepower unit is being added to increase the rating of the station to 24,000-horsepower. The additional unit will be in operation by April 15. That company's line extends east to the Big Lake Field. Another transmission system goes into the Yates Field and a third goes into the McCamey district and thence north into the Church and Fields Pool.

All of this work has been carried on during the past 18 months. While the electrical companies have made their greatest extension into West Texas each company has plans for further extension of its lines and the expansion of its business.

STATE CANNOT STOP EXPORTATIONS OF GAS

AUSTIN, Tex., Feb. 18.—"The transportation of natural gas from one state to another is interstate commerce and this state can not prevent it though the gas is to be used in the state to which transported for the purpose of manufacturing it into carbon black," Assistant Attorney General Allen Clarke ruled in an opinion approved by Attorney General Claude Pollard and sent to the Railroad Commission.

Power to prevent waste of natural gas is given the commission by the Legislature. The commission has held that use of gas for carbon black is a waste. Exceptions are made where gas is going to waste and can be used in no other way.

R. D. Parker, chief of the oil and gas division of the commission, says it is not probable that any steps will be taken by the commission as a result of the ruling.

The inquiry was based on reported plans to pipe gas into Louisiana to make carbon black. Use of the gas for carbon black manufacture has been held waste by the commission. In the meantime, however, it is understood arrangements have been made to turn the gas into lines furnishing municipal gas supplies and it is no longer the intention to use it for carbon black.

The decision was in the face of a brief submitted by W. H. Francis of Dallas, which took the position that gas is the property of the state as game and that the state has the same right to prohibit its shipment out of the state as it has to prohibit shipment of game for sale.

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Deep Tests and Production Holes

If you desire to make a deep test in the hope of striking oil, you can use the gasoline driven "P-2" or "FK" drill—to core the strata penetrated, and at the same time drill a hole large enough for production.

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In a new field where formations are unknown, the ability of the diamond drill to bore hard or soft material as it is encountered is an important economy.

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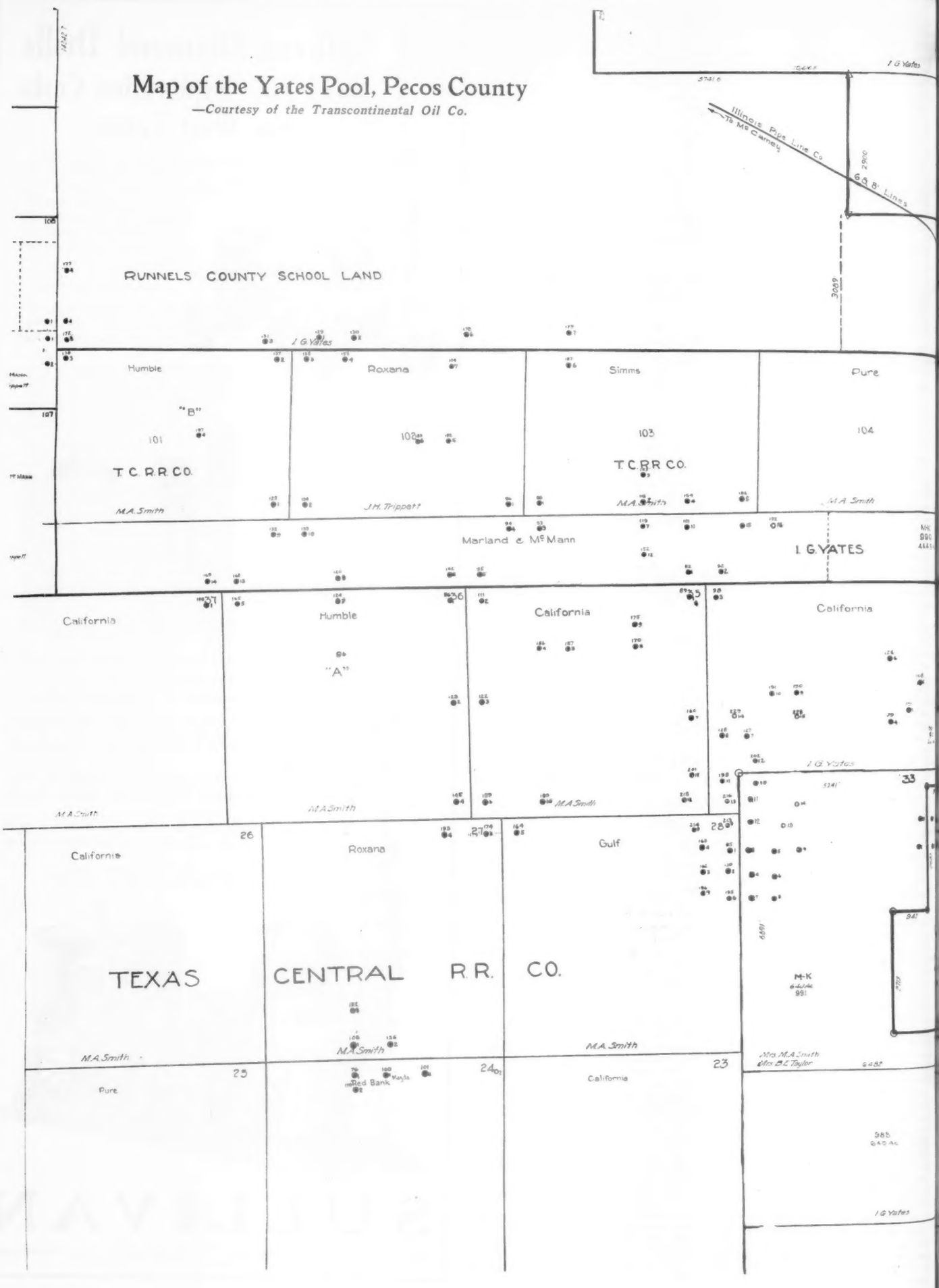
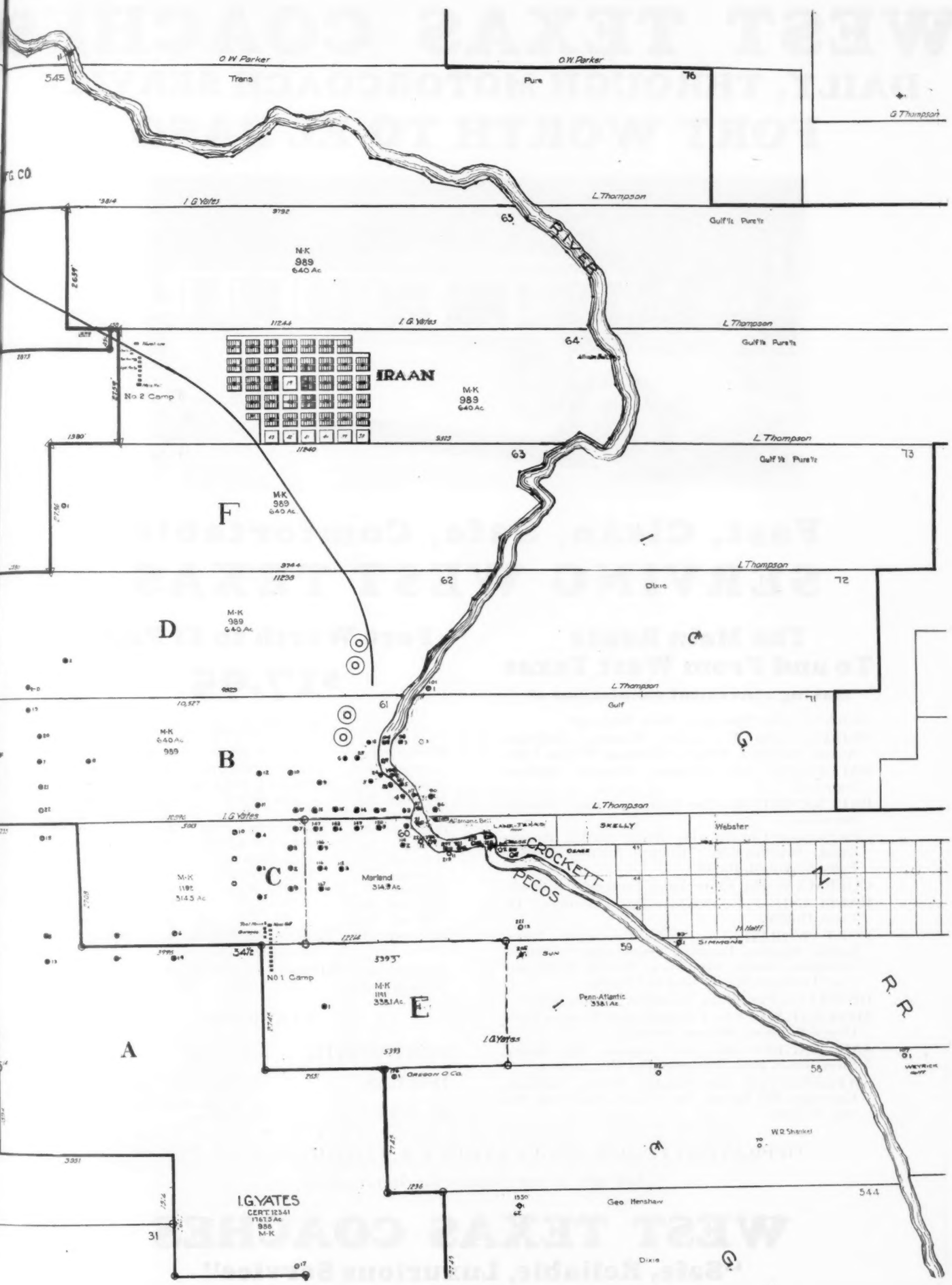
Map of the Yates Pool, Pecos County

—Courtesy of the Transcontinental Oil Co.




O.W. Parker
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I. G. Yates
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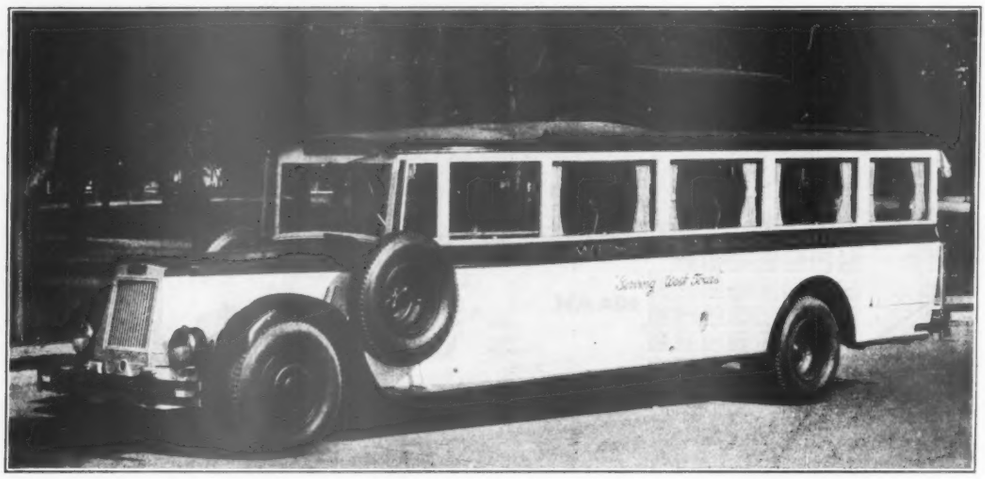

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5:45 pm		MINERAL WELLS		10.00 am
9:50 pm	Ar.	ABILENE	Lv.	6:20 am
10:00 pm	Lv.	ABILENE	Ar.	6:10 am
11:30 pm	Ar.	SWEETWATER	Lv.	4:50 am
12:01 am	Lv.	SWEETWATER	Ar.	4:30 am
1:00 am		COLORADO		3:30 am
2:30 am		BIG SPRING		2:00 am
3:45 am		MIDLAND		12:50 am
6:30 am	Ar.	PECOS	Lv.	10:00 pm
7:00 am	Lv.	PECOS	Ar.	9:30 pm
11:00 am	Ar.	SIERRA BLANCA	Lv.	5:45 pm
		Mountain Time		
10:00 am	Lv.	SIERRA BLANCA	Ar.	4:45 pm
12:40 pm	Ar.	EL PASO	Lv.	2:00 pm

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Geophysical Results in West Texas

Torsion Balance Work in Dawson County Described. Big Lake and McElroy Fields Used as Types for Plains Area to North

By D. H. Thornburg

Geophysical methods for determining subsurface structure are very much discussed at this time; however, most of the published articles have dealt with the theory and not the practice.

The theoretical uses of the various geophysical instruments such as the torsion balance, seismograph and magnetometer are sound, since the methods are based upon definite physical principles. The practical use of these same instruments depends upon their adaptability to the prevailing conditions in any given district, and the ability of the geophysicist to interpret, geologically, the recordings of the instrument. To determine the adaptability of these instruments in a new territory, the process is difficult unless we have some knowledge of the subsurface structure and stratigraphy at the beginning of the experiment. In the Permian Basin of West Texas there are local known subsurface "highs" over which the various instruments may be used to establish type results. Sufficient subsurface information is also available regarding the regional structure and the general contour of the basin, to establish type results over areas of normal regional dip.

During the experimental period of establishing these types, certain of the instruments may be found practical and others impractical. These same instruments, however, may hold inverse positions of value in some other district where a different set of geological conditions prevail. This is readily understood when we consider the great geologic differences of the four principal oil producing provinces of Texas: The Salt Dome Province, the Fault Zone Province, the North Central Texas Province and the West Texas Permian Basin Province.

Big Lake and McElroy

In West Texas the Big Lake and the McElroy Fields have been used as types for the flat plains area to the north, a large area in which the stratigraphic sequence is very regular. Big Lake and McElroy are pronounced and definite subsurface "highs," and it is generally well known that both of these "highs" are reflected as gravimetric maximums by the torsion balance measurements, that is, they are areas which enclose a relatively dense mass buried below the surface. That these areas of greater density reflect uplifted masses, and not included or intruded masses, is proven, practically, by subsurface information given by the well logs.

Gravimetric maximums, measured by the torsion balance, are represented graphically much in the same manner that ordinary geologic structure maps are prepared. A gradient map is first drawn, the gradient arrows representing the horizontal rate of change of the vertical component of gravity. The direction of these arrows indicates the direction of the greatest change, and the length of the arrows indicates the degree of this change. A gravimetric maximum will, therefore, be represented by gradient arrows directed inward toward the center of the area, and a gravimetric minimum by arrows directed outward from the center.

These same measurements may then be illustrated by an isogam map which bears a similar relation to the gradient map that a contour map bears to a dip and strike map. The isogammes represent lines of equal value of the vertical component of gravity and show the total change in vertical intensity. The completed isogam map may illustrate small irregularities, "noses," closures, and all the intricacies common to a subsurface structural contour map. The accompanying illustration is an isogam map of a very large and pronounced gravimetric maximum in Dawson County, Texas.[1] The outline, or contour, is so regular over so large an area, and the difference in density so great that there can be no doubt of the presence of a relatively dense mass underlying this area. Interpretation as to the character of such a buried mass is one of the problems confronting the geophysicists and geologists. However, it is tentatively correlated with the type results in Big Lake and McElroy, where the areas of greater density overly uplifts of the Big Lime.

Question of Interpretation

In the vicinity of eastern Dawson County, the regional dip of the Big Lime is westward; the regional direction of the gravimetric gradients is up the dip or eastward; the buried mass or uplift is superimposed upon this dip, and an important question of interpretation arises from this. That is, will the apparent maximum lie immediately above the center of the dense mass or uplift, or will the apparent maximum be drifted eastward due to the prevailing up-dip influence? It is quite probable that the combined influence of the prevailing regional dip plus the local interruption is reflected by an apparent gravimetric maximum some distance up the dip from the true maximum. The drift may amount to anything from a few feet up to 1, 2, or 3 miles, but may be computed by the geophysicist.

The foregoing problem of interpretation is given as an example of the various problems confronting the geophysicists in every area. From this it may readily be understood that a wildcat failure, either an unproductive or structurally low well drilled upon an apparent gravimetric "high," does not condemn or disprove gravimetric work or geophysical methods to any greater extent than do similar drilling results upon an apparent subsurface "high" condemn the practice of subsurface geology.

The geophysical information, after passing through the experimental period of determining the adaptability of the instruments to the region, must be interwoven with the geologic information. The gravimetric, seismic, or magnetic data must be correlated with the subsurface structure and stratigraphy, just as newly discovered dips and strikes, or subsurface datum figures are correlated. The correlation of these factors is, of course, reduced to a personal interpretation, which

[1]Only a sufficient number of gradients are illustrated upon this map to show the relation between the direction of the gradient arrows and the gravimetric center.

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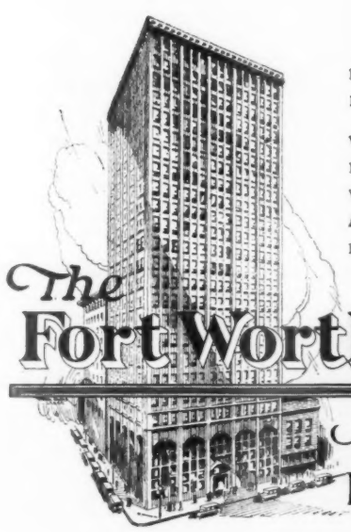

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in many cases must undergo revision from time to time, just as the geologist's ideas of the subsurface structure undergo revision with the addition of new control points.

Numerous Tests Drilled

During the past year, a number of exploratory test wells have been drilled in Texas upon purported torsion balance "highs"; some of these have been successful and some have been failures. To valuate the failure or success with the relation to geophysical data, one should first regard the district in which the test is made before drawing conclusions regarding the use of the same instrument or method in his own district. Moreover, he must have the information at hand to differentiate between the various types of geophysical "highs," just as he would in reviewing the drilling results on structural terraces, noses, closures, etc., illustrated upon a subsurface structure map.[2]

The gravimetric maximum illustrated in Dawson County is an excellent example of a gravimetric isogam closure. It cannot be attributed to local influences, since the measurements for miles in each direction point uniformly to a common center. It is, likewise, improbable that it can be attributed to the presence of an included mass, since an inclusion in a sedimentary section such as this, would be very irregular in outline with interfingering along the outside edges and would not be reflected by the symmetry illustrated on this map.

Since we do not know of any instrusions in this province, we cannot explain the maximum in this manner; therefore, it seems very probable that the buried dense mass is in reality an uplifted mass of the relatively dense Big Lime strata.

[2]By this statement it is not meant that gravimetric isogam-noses and structural contour-noses are synonymous. The intent here is that the interpretation of the two is parallel.

WEST TEXAS REFINING EXPANDING RAPIDLY

(Continued from Page 106)

refiners are finding profitable outlets in Old Mexico and this promises to be a fertile field for future development.

Nine Companies

The accompanying table gives a list of the companies operating refineries, including those under construction. Three or four more companies are considering the advisability of building plants. The present crude oil output is several times greater than the requirements of the plants now operating. The trend in refining will depend on future crude oil developments and general market conditions.

Bluebonnet Plant

The plant of the Bluebonnet Oil Refining Co. is the latest of the West Texas refineries to start operating. This plant was described in an article appearing in the February 2 issue of The Oil and Gas Journal, page 112. Located at Wickett, in Ward County, it secures its crude supply from the Southern Crude Oil Purchasing Co., which has a pipe line connection to the Winkler County Pool. The plant has a capacity of 5,000 bbls. daily.

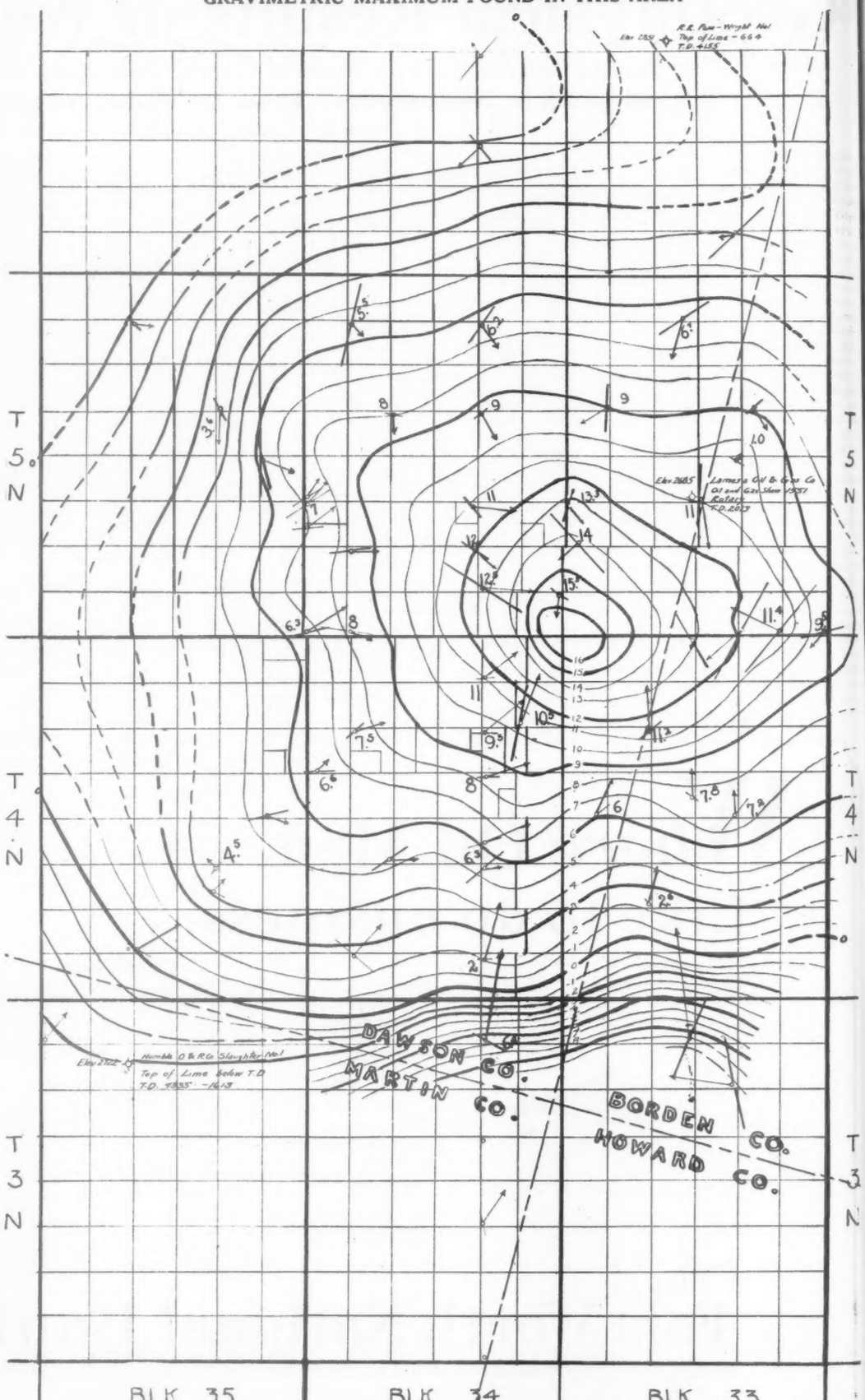
A pipe still is used for distillation. The plant is an example of the progress made by the refining industry in the design of skimming plants for operating conditions such as prevail in the West Texas area. The plant is largely an assembly of factory made equipment and could easily be removed to another location.

John T. Withers, Jr., is president of the Bluebonnet company and B. L. Woolley, general manager. I. B. Chittenden is superintendent of the plant.

The plant of the Col-Tex Refining Co., located at Colorado, Tex., has been operating for over two years. Starting out with a small topping plant, the operations have been enlarged to 8,500 bbls. daily. This company has solved many of the problems peculiar to that particular section of West Texas and now manufactures practically a complete line of light oil products.

Located in Mitchell County on the

GRAVIMETRIC MAP OF SOUTHEASTERN DAWSON COUNTY, TEXAS, ILLUSTRATING THE GRAVIMETRIC MAXIMUM FOUND IN THIS AREA



Torsion balance survey—by North American Exploration Co. Interpretation and map—by Dr. J. Schander and D. H. Thornburg. Note: The isogammes represent the net results of the survey; the gradients are illustrated only in part.

GRAVIMETRIC GRADIENTS—1 m.m.=1.10^{-3} c.g.s.

The gradients represent the horizontal rate of change of the vertical component of gravity. The direction of the arrows indicates the direction of the greatest change; and the length of the arrows indicates the degree of this change.

ISOGAMMES—Values 10^{-3} c.g.s.

The isogammes represent lines of equal value of the vertical component of gravity, and show the total change in vertical intensity.

COLEMAN
COMING CENTRAL CITY

Depicting the beauty of design and location of churches representing several denominations.

The recently completed modern High School Bldg.

Featured by the discovery and development of shallow oil fields in four directions from Coleman, nearly all of which test above 42 gravity oil, this city has advanced phenomenally during the past 6 months. Nightly the Coleman Hotel is a bedlam of oil men from roughnecks through lease brokers to operators and company officials.

Although the influx of supply houses has now reached a total of four with fully 15 companies officing here in some phase of the oil business there still remain several advantageous industrial sites, priced moderately, available for new businesses.

In addition to the oil possibilities, a rich, fertile, tillable agriculture district suitable for stock and farming purposes surrounds the city. Furthermore, an architect has just been retained to prepare plans and specifications for a five-story office building on which numerous companies are waiting to establish offces in this city.

The total deposits to date of the Coleman banks are $2,801,182.82

The artists conception of the proposed $75,000 Howell Theater on which construction will start this month.

The Overall Memorial Hospital, with wonderful sick-room facilities and competent staff.

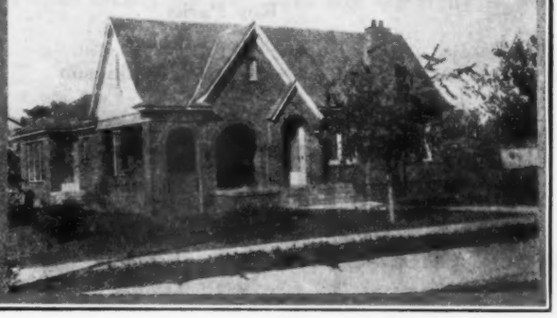
A partial view of the Martin Brick Co. owned and operated by C.W. Martin who makes the only face brick in West Texas.

The four-story Coleman Hotel with 64 rooms.

Showing the discovery well of a high gravity oil pool 6 miles northeast of Coleman.

Another modern brick home opening a sub-division in this city.

Representative type of Permanent brick homes.



Texas & Pacific Railroad, the company has access to the production in Mitchell County and other nearby pools. The Standard Oil Co. of California has considerable production in that section and has a part ownership in the Col-Tex company. The Anderson-Prichard interests own the remainder of the company and have charge of the management, L. H. Prichard being president and J. Steve Anderson, vice president. The general offices of the company are located with the Anderson-Prichard Oil Corp. at Oklahoma City.

The marketing position of the Col-Tex Co. was materially improved when it was placed in the Ranger rate group in shipments to northern consuming points.

In addition to its interest in the Col-Tex Co., the Standard Oil Co. of California recently organized another subsidiary known as the Pasotex Petroleum Co. The latter company is now building a 10,000-bbl. skimming plant at El Paso. The Standard company, in addition to its present production in the West Texas Field, has large undeveloped holdings. The El Paso refinery will furnish an additional outlet for this crude and also enable the company to extend its marketing along the West Coast to include New Mexico, Texas and adjoining states.

The operating organization of the Pasotex Petroleum Co. has not yet been announced, the construction work being in charge of the parent company at San Francisco. It is expected that the plant will be completed and ready to start operating about July 1. To start with, the crude oil will be brought to the refinery in tank cars. Later the company expects to build a pipe line connection to the fields.

At El Paso, the Rio Grande Oil Co. for several years has operated a 3,000-bbl. skimming plant. The main offices of the company are located in Los Angeles, although an operating office is maintained at El Paso. The same company operates skimming plants at Los Angeles and Phoenix, Ariz. L. E. Lockhart is president of the company.

The Humble plant at McCamey is the largest in the West Texas area, having a capacity of 12,000 bbls. daily. Its crude oil runs to still in February are on a 12,000-bbl. daily basis. The Humble has an extensive pipe line system in West Texas and crude oil from practically all the fields can be made available to the refinery. The plant has a direct pipe line connection with the Yates Pool in Pecos County. The location is the southwest corner of Upton County on the Orient Railroad.

The San Angelo plant was taken over by its present owners during the past year. The new owners have enlarged the plant and installed new equipment adapted to the processing of the West Texas crudes. The company disposes of the bulk of its plant output locally. R. P. Humes, formerly connected with the refining department of the Transcontinental Oil Co., is vice president and general manager of the company.

The Sweetwater plant is a small local unit operated by the Sweetwater Refining Company. The products are distributed in and near Sweetwater.

At Pyote, in Ward County, southwest of Wickett, the Valley Refining Co. is building a skimming plant. The plant is scheduled to start operating about March 1. The plant is owned by Eugene Griswold and associates of Wichita Falls, Tex.

Distillation Tests of West Texas Crudes

In the following report a summary of distillation tests of West Texas crudes is given with a detailed report of representative fields. These tests were made by A. J. Kraemer, Peter Grandone and C. S. Luce of the Bureau of Mines.

LAVACA COUNTY SURVEY

YOAKUM, Tex., Feb. 18.—Five surveyors have been in Yoakum several days in connection with a preliminary survey through the southern portion of Lavaca County for the Humble company's oil pipe line which is to run from Lytle to Webster, connecting with the Gulf Coast

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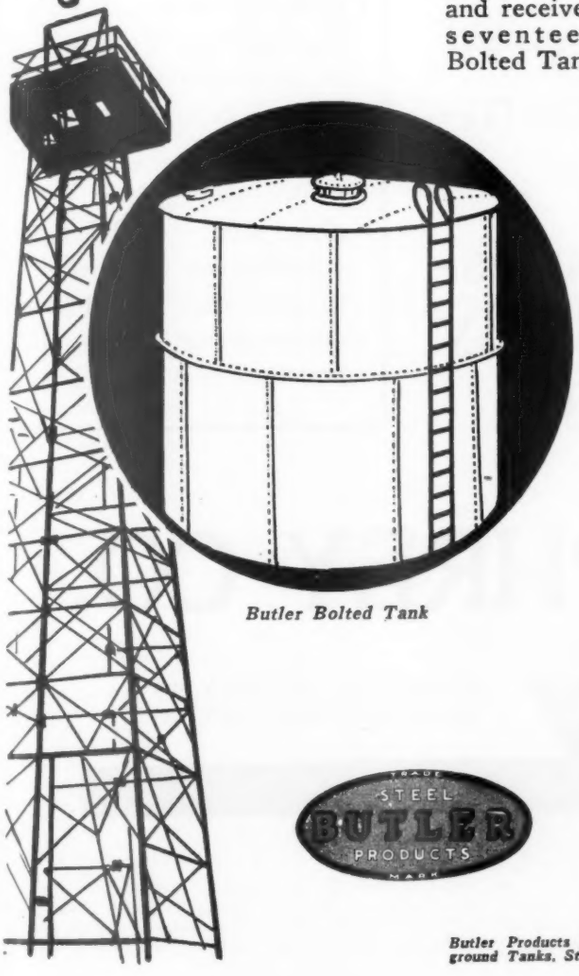
Promises of speed are fulfilled. No wonder such prompt service is asked of us.

Butler Bolted Tanks are specifically made for speedy erection. All holes punched in massive machines are dependable as to placement. Large sheets with fewer seams mean less handling and fewer chances for leaks.

All sheets are made of blue annealed copper steel or 3/16" tank plates for added strength and rigidity where needed.

The "Oil Field Tanks" Catalog will be sent on request. Send for a copy.



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All bolts are removable from the outside!

Any kind of welded tank made to your specifications. Also bolted tanks up to 25,000-barrel capacity.

These reliable dealers erect Butler Bolted Tanks and are ready to serve you speedily:

M & V Tank Co. at Wichita Falls, Olney, Nocona, Cross Plains, Albany, Cisco, Isom, Pampa and Brownwood, Texas.

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PORTABLE STEEL BUILDINGS — OIL FIELD TANKS

FROM COW COUNTRY TO AN OIL KLONDIKE

(Continued from Page 85)

depth of the wells in this area is around 3,000 feet and they are drilled with cable tools.

Discovery of Yates Pool

While this development was going forward the prize bundle of West Texas was ripped into. The Yates Pool in Pecos County has been heralded as the most sensational shallow discovery in the history of the industry. Its records are numerous and among its achievements are the completion of several gushers.

Mid-Kansas Oil & Gas Co. and Transcontinental Oil Co. discovered the pool late in 1926, in eastern Pecos County in a country that was chopped up with steep hills and valleys. The discovery well was drilled to a total depth of 997 feet.

The most sensational gusher was the Mid-Kansas and Transcontinental Oil Co.'s No. 2-C Yates which flowed at the rate of 65,000 bbls. daily for one hour. Several other wells of the gusher class have been drilled in the field and among the largest wells drilled is one by the Simms Oil Co. that is rated good for 50,000 bbls. daily.

Fortune smiled swift and sure on Ira G. Yates, owner of the now famous ranch. At the time the discovery was made livestock was low and a drought had destroyed his crops. Thirty-four per cent of the producing property, as now defined by a proration committee, is controlled by the Mid-Kansas company and Transcontinental company and most of it is on the Yates ranch.

Discovery of the Yates Pool revealed a new and growing mood among operators for co-operation. Seminole was producing a flood of oil and Yates was revealing its potentialities. Pipe line facilities in the field were wholly inadequate and a costly storage building program was inevitable unless some measures were taken to arrest production. A proration plan based on a percentage of the hourly gauges of the wells was worked out. A new plan was substituted at the first of the year on the basis of proven acreage owned by each company. This plan was ratified by the dominating majority of operators and is effective until July 1.

The Yates Pool has been practically defined to the south and east and northwest. The water situation on the east side of the field has caused some alarm. Water also has encroached on the northwest side of the field.

At the present time the pool is pinched in to 44,017 bbls. daily from 123 wells. The potential production, however, is several times that figure. Storage is noticeably lacking in Yates and at the first of the year there was less than 1,000,000 bbls. of storage in the entire field, including flow tanks.

Hendricks to Forefront

When veterans were still shaking their heads in discussing Yates, Hendricks Field in Winkler County forced itself into the forefront and is continuing rapidly forward. At the time this is being written the field made 116,000 bbls. from 67 wells during the last 24-hour period. The structure apparently will be a long narrow one. The field is about 1½ miles wide and 5 miles long. It has been defined to the south but the wells on the north end do not give any indication of a closure.

Hendricks was discovered in 1926 by a 120-bbl. well which was later drilled deeper and made 370 bbls. daily. Just recently the Roxana Petroleum Corp., one of the large producers in the field, drilled the prize well of the pool on a high part of the structure. It was opened up for one hour and gauged 1,115 bbls.

Over to the northeast of Hendricks, the Amerada Petroleum Corp. is believed to be drilling in a new pool. That company's well is about 3 miles northeast of production and is thought to be on an entirely new structure.

The prolific development in Hendricks prompted the building of several pipe lines in the field to a railroad about 25 miles south. Two trunk lines have been extended into the field and most of the production is being taken by the pipe line companies who either move it through main line systems or send it out in tank cars. Several of the Hendricks Field wells are pinched in and it is estimated the field could produce 250,000 bbls. daily with its present producing wells and those drilling.

Water Encroachment Serious

Water is a serious problem in that field with 26 wells having shown water. All but two of these are on the west flank of the structure. Two wells have shown water further up the structure but the water in one was plugged off. One of the wells showing water is 4 miles north from the extreme south end of the structure.

Heavy flush production in the field has resulted in a rapid storage building campaign. On February 1, 1928, 3,100,000 bbls. of crude were in storage. The storage capacity at that time was 4,100,000 bbls. Around 1,200,000 bbls. of additional steel tankage is being built and grading is being done for 350,000 bbls. more.

Weaving into the development of West Texas are the histories of the Westbrook Field, Mitchell County; Wheat Field in Loving County; Connell Field in Ector County; Howard County developments; Fisher, Runnells and Jones Counties as well as the opening of the Powell Field in Crockett County. At this time most of them play an important part in the potentialities of West Texas.

Powell was in reality the second pool discovered in West Texas. It is 14 miles south of the town of Big Lake, near the field bearing that name in Reagan County. Soon after its discovery it was put in the class of controlled fields by purchases made by producing companies and it has failed to reach any sensational heights.

Howard County will figure strongly in the future of West Texas. Deep lime production was opened by the Magnolia Petroleum Co. when it brought in a well making better than 3,000 bbls. from a total depth of 2,990 feet. Since that discovery two other wells of equal caliber have been drilled. However, those wells have been shut in because of inadequate pipe line facilities and a proration plan has been worked out for the deep production of that area. Howard County has two other potential areas that have not been tested for their worth. Both are discoveries of the Marland Oil Co., one of which was a joint discovery with the Texon Oil & Land Co.; the latter is in the Settles Field and the other discovery is in the Harding Field.

Jones County came into West Texas' picture with the discovery of Noodle Creek and a discovery a short distance from that pool indicates the opening of another pool for Jones County.

Runnels and Fisher Counties are both newcomers in the ranks of West Texas producing counties and each has one well. Wheat Field, in Loving County, has only two producers at present as has the Connell Field in Ector County.

The Westbrook Field in Mitchell County rounds out the list for the broad open spaces. Production from this county is around 3,400 bbls. daily and the production from the field is being handled by the Col-Tex Refining Co. All the wells are pumpers and come in for around 100 bbls. initially from 3,000 to 3,100 feet and hold up remarkably well.

In closing there are two other potential areas of West Texas that will be watched closely. Neither is likely to be drilled rapidly should it develop into prolific regions. One is the Roxana-Llano Scarborough area in Winkler County. The first well was good for about 40 bbls. The other is the Gulf Production Co.'s discovery on the Waddell ranch in Crane County. It is a 30-bbl. well.

OIL FIELD ROAD

MIDLAND, Tex., Feb. 18.—Horseback survey of a proposed oil field road from Midland to Jal, N. Mex., has been made by Spencer Jowell, Timberline Floyd and Hilory Bedford, ranchers representing the Midland Chamber of Commerce.

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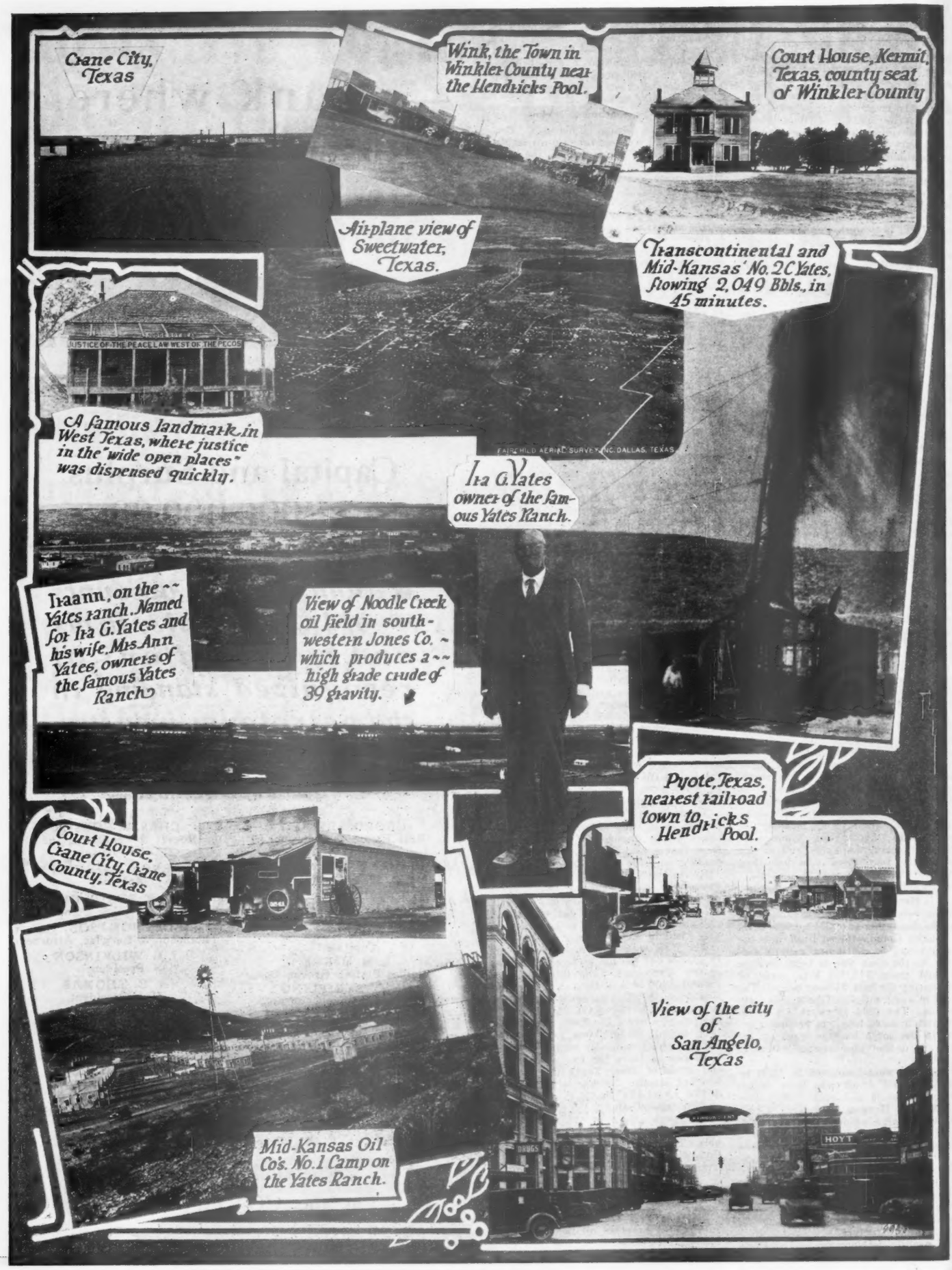
Crane City, Texas
Wink, the Town in Winkler County near the Hendricks Pool.
Court House, Kermit, Texas, county seat of Winkler County
Airplane view of Sweetwater, Texas.
Transcontinental and Mid-Kansas' No. 2 C Yates, flowing 2,049 Bbls., in 45 minutes.
JUSTICE OF THE PEACE LAW WEST OF THE PECOS
A famous landmark in West Texas, where justice in the "wide open places" was dispensed quickly.
FAIRCHILD AERIAL SURVEY INC. DALLAS, TEXAS
Ira G. Yates owner of the famous Yates Ranch.
Iraann, on the Yates ranch. Named for Ira G. Yates and his wife, Mrs. Ann Yates, owners of the famous Yates Ranch
View of Noodle Creek oil field in southwestern Jones Co. which produces a high grade crude of 39 gravity.
Pyote, Texas, nearest railroad town to Hendricks Pool.
Court House, Crane City, Crane County, Texas
View of the city of San Angelo, Texas
DRUGS
HOYT
Mid-Kansas Oil Co's. No. 1 Camp on the Yates Ranch.

Dependable Electric Power in the Winkler Field

TYING in with the regular service, the Texas-New Mexico Power Company is just completing a Power Plant

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Which means added safety for the operator, insuring him against electrical storms which are prevalent in this locality.

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PIPE LINE DEVELOPMENT IN WEST TEXAS FIELDS

(Continued from Page 90)

The corporation's main station will be built at McCamey.

Rumors that other lines would be built into West Texas have flared and dimmed at various times. They were to the effect that the Sinclair Pipe Line Co. might build a 30,000-bbl. capacity 10-inch line to Mexia, Tex.; The Texas Pipe Line Co. a 10-inch artery of 30,000 bbls. capacity to Port Arthur, Tex.; Gulf Pipe Line Co. a 50,000-bbl. capacity 12-inch line to Corpus Christi, Tex.; and the Prairie Pipe Line Co. a 30,000-bbl. 10-inch system to Cross Cut, Tex. The combined capacity of the "rumored" lines would be 140,000 bbls., but so far these reported proposals are purely rumors.

Loading Rack Capacity

Loading rack capacity of West Texas is far in excess of present requirements. Many of the racks built in the early stages of development are idle as a result of the trunk line completions. It is estimated that racks accommodating 357 tank cars at one time are in service at present. These, based on a movement of 357 cars daily of 200 bbls. per car, could move 71,400 bbls. from the fields, and at that rate it would be possible to move 2,142,000 bbls. monthly.

December pipe line reports, however, showed the delivery of 5,151,912 bbls. out of West Texas. Of that total, 1,259,726 bbls. were shipped out by way of tank cars and the remaining 3,892,186 bbls. were pumped through the trunk lines. Production for that month was 7,680,844 bbls., leaving 2,528,932 bbls. going to storage. Stocks at the first of the year amounted to 14,600,000 bbls.

Tank car shipments during January are expected to show a marked increase. At the same time, production increased and pipe line facilities are in a position to move more oil.

The greatest movement of crude by way of tank cars is now from Ward County, where the Hendricks Field lines terminate on the Texas & Pacific Railroad. A preliminary survey of tank car movements out of Hendricks reveals that approximately 1,043,000 bbls. were shipped during January. This compares to 650,000 bbls. shipped from that field in December. This rapid gain in tank car shipments is not expected from the other areas. The oil is going to refineries at Houston, El Paso, Dallas, Fort Worth, Shreveport, La., Narco, La., Woodriver, Ill., East Chicago, Ind., Whiting, Ind., New Orleans, La., Sugar Creek, Mo., Wickett, Tex., and seaport at Baytown and Texas City, Tex.

Railroad Facilities

It is conservatively estimated that the two railroads, the Orient and Texas & Pacific, can handle 125,000 bbls. daily of tank car shipments. The Orient Railroad is variously estimated to be capable of moving anywhere from 75,000 bbls. to 150,000 bbls. daily over its line, and the Texas & Pacific is estimated to be in a position to move approximately 50,000 bbls. at present. The Texas & Pacific estimate is made because of the heavy traffic over the Texas & Pacific lines that was built up prior to the oil development in West Texas. However, the Texas & Pacific will be in a position to move 140,000 bbls. daily by the middle of April when an expansion program will have been completed.

A proposed railroad, the Texas & New Mexico, would provide a third rail outlet if built. The proposal is to build the line from Monohans, in Ward County, Texas, and one of the terminal points for the Hendricks Field lines, to Carlsbad, N. Mex., to make connections with other roads. However, that proposed project would be months in the building and does not offer any immediate avenue for the moving of crude.

Refining capacity in West Texas has grown to 25,000 bbls. daily with the completion of a 3,500-bbl. plant at Winkler. The refineries are as follows: Col-Tex Refining Co. at Colorado, 10,000 bbls. capacity; Humble Oil & Refining Co. at McCamey, 10,000 bbls. capacity; San Angelo Refining Co. at San Angelo, 1,500 bbls. capacity; and the Bluebonnet Refining Co. at Winkler, 3,500 bbls. capacity. All of the plants are regarded as steady running refineries and usually run close to capacity.

Field Production

Pipe liners are having their greatest difficulty in the Crane-Upton and Hendricks areas. Yates, a great pool and a greater potential pool, is causing the least trouble. It is being held down to a production of around 50,000 bbls. daily by a proration plan of some form which has been in effect since the pool's first group of gushers threw another scare into a nervous industry. Despite the fact that a number of wells are pinched in in the Hendricks Field, due either to water intrusion or inadequate storage, Hendricks is producing a large volume of oil. On February 9 the field reached a new peak when 67 wells made 113,767 bbls. Crane and Upton, while showing decline, are producing beyond the field's pipe line facilities and have a large number of proven locations yet to drill. Several other areas, however, have pipe line facilities beyond their requirements.

Building of the lines into the new territory gave the pipe liners many difficult obstacles to overcome. The trunk system running east had a fairly good country to traverse with fairly good rail facilities and roads but the two lines going south toward the Gulf had to cross country roughly broken in spots, distantly isolated from railroads and where most highways were cow trails.

In going over some of the mountainous country one company had to blast roads in order to move pipe and station equipment. Deep canyons had to be gone around and in other sections the same company had to traverse swamp lands.

Most of the pump stations are powered by engines but several are being operated by motors.

Pipe Lines and Corrosion

The sulphur content of West Texas crude is not expected to give serious trouble for some time to the trunk lines. In Reagan County the Reagan County Purchasing Co. has had little trouble with its main line but serious damage has been caused by the sulphur crude to the gathering system.

Pipe line officials are of the opinion that the sulphur crude in motion, under pressure, enclosed from air, will not corrode the pipe rapidly. The Reagan County company's gathering system is a gravity system. The oil moving slowly through these lines has corroded the bottom of the pipe rapidly. To save the expense of laying new line the corroded sections are turned a quarter or a half turn as is necessary and the pipe kept in service until the other side is eaten out.

Pipe line facilities for West Texas may be a long time in reaching the daily production of that area if it goes even fairly close to the estimated potential production. The most conservative estimate is that both Yates and Hendricks are capable of making several times their present output. The Crane-Upton area's decline could easily be halted by increased drilling. On top of that, several new areas give promise of more production, Howard County in particular. In this county the Magnolia opened up prolific deep lime production, one well averaging better than 3,000 bbls. for three months. At the end of that time the well was shut in when another deep well was drilled in making 3,700 bbls. initial. Both wells are now shut in because of inadequate pipe line facilities and to avoid building storage. It is probable a proration plan will be worked out for that area.

By April 1 it is probable that 385,000 bbls. daily might be moved out of West Texas if the demand continues to increase. With the trunk lines, as shown by the accompanying map, and local refining capacities plus the maximum rail outlet, which will be available April 1, the foregoing estimate is reached. Even with an outlet for that much crude authorities estimate that production will be much greater than that and could be held around 450,000 for several months.

COLEMAN

Centrally located, with a system of excellent roads radiating to all points of the producing area and with living conditions second to no City in Central West Texas, this place should make an ideal home for people interested in the Oil and Gas business.

Shield-Maddox Company
COLEMAN, TEXAS

Conducts a dignified and efficient lease and royalty business at Coleman.

CANNON AND CANNON

Petroleum Geologists

RECOMMENDING FAVORABLE AREAS FOR THE PRODUCTION OF OIL AND GAS IN WEST TEXAS

Offices:

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ADOPT ELECTRICITY

—AND PUMP MORE OIL FOR LESS COST

ULTIMATE PUMPING ECONOMY IS DETERMINED BY SCIENTIFIC BALANCE OF FIRST COST OF INSTALLATION AND OPERATING EXPENSE THEREAFTER

OUR UNLIMITED ELECTRIC TRANSMISSION LINE SERVICE IS NOW AVAILABLE IN WINKLER COUNTY AND SURROUNDING AREAS.

TEXAS ELECTRIC SERVICE CO.
TEXAS POWER & LIGHT CO.

GENERAL OFFICES: DALLAS, TEXAS

GULF COAST FIELDS

(Continued from Page 51)

a Spindletop well in its No. 7 fee, which was an old well deepened to 5,031 feet. Sun Oil Co. failed to make a well out of its No. 19 Marrs McLean from sand at 5,125 feet and is drilling deeper. Sun's No. 20 on this tract is drilling at 5,080 feet. Its No. 2 Price was bailing at the close of the week to test sand at 5,375 feet. Rio Bravo Oil Co.'s No. 54 T. & N. O. is drilling at 4,335 feet.

The Texas Company is starting drilling in its No. 1 Gladys City, the furthereast north test in the west flank of the dome. North of Spindletop, Traders Oil Corp.'s No. 1 Cissell is drilling at 3,125 feet.

Markham—Matagorda County

Rycade Oil Corp. and Humble Oil & Refining Co.'s joint test, No. 1 Hudson, is drilling sticky shale at 1,056 feet. Sexton Gas Co. is building a derrick for No. 1 Smith, and Amsher & Bess's No. 1 Smith is drilling below 1,000 feet.

Moore's Field (Orchard)—Fort Bend County

Gulf Production Co.'s No. 15 Moore, the only drilling test in the field, is down 2,060 feet.

Blue Ridge—Fort Bend County

Blue Ridge's sole completion of the week was Sam Watts and associates' No. 3 Blakely, which came in flowing 80 bbls. daily from sand at 3,210 feet. Navarro Oil Co.'s No. 1-A Robinson swabbed salt water at 3,678 feet and has been abandoned temporarily. H. B. Gordon, as trustee, is to put No. 2 Blakely on the pump at 3,120 feet, it having failed to make a flowing well. Blakely & Means' No. 1 Blakely is drilling at 3,240 feet. H. R. Cullen's No. 1 Luscher is down 2,300 feet, his No. 1 Lafferty 2,798 feet and his No. 1 Davidson 3,105 feet. Cunningham Production Co.'s No. 4 B'akely is drilling around 3,200 feet. Gordon, Folwell & Dickson have a rig up for No. 1 Blakely. Gulf Production Co. is drilling at 4,675 feet in No. 11 West Schenck. This company's No. 11 Luscher is down 3,430 feet. Navarro Oil Co. has a rig up to deepen No. 3-B Robinson.

Big Creek—Fort Bend County

Gulf Production Co. got a 300-bbl. pumping well at Big Creek the past week when it completed No. 36 Davis, an old well deepened to 3,584 feet. This company's No. 24 Davis, another old well, is drilling at 3,100 feet, while No. 45 Davis, a new well, is down below 3,120 feet. The Texas Company's No. 3 Wheat is drilling at 3,925 feet.

Nash Dome—Fort Bend County

Rycade Oil Corp.'s No. 9 Wisdom, an old well deepened to the sand at 4,289 feet, failed to make a well at that depth and now is being drilling deeper, being down 4,326 feet. This company's No. 22 Wisdom lost the core barrel at 4,513 feet and has a fishing job under way. A rig is up for No. 23 Wisdom and also for No. 24 Wisdom. No. 13 Nash is drilling rock at 918 feet.

Hardin County Domes

At Batson, East Batson Oil Co.'s No. 10 Conzelman is drilling at 1,175 feet. At Saratoga drilling has been started by Gulf Production Co. at its No. 25 B.B.-B&C, the hole being down 540 feet. At Sour Lake, Elberts, Tallourne & Hebert have abandoned their No. 3 Jackson temporarily. It tested dry at 2,900 feet. Humble Oil & Refining Co.'s No. 2 Farish & Ireland is drilling gumbo at 1,677 feet. Gulf Production Co. also started drilling during the week in its No. 1 Hamman, and Saturday was shut down 1,128 feet. Gulf's No. 3 Thomson is drilling at 3,700 feet.

Pierce Junction—Harris County

Navarro Oil Co. got an 800-bbl. well in its No. 2-B Cain at Pierce Junction. This well is producing from the deep sand at 5,047 feet. H. R. Cullen almost had a blowout in his No. 4 Howe while being tested at 4,919 feet. The gas started blowing out around the liner and it was with much difficulty that it was kept under control until it bridged over. No. 5 Howe still is only a derrick, as the rig now on No. 4 will be used. Anderson & Plummer's No. 2 Whitehead is drilling around 4,475 feet. Joe Basbara's No. 2 fee is down 2,300 feet. Gulf Production Co. has a rig up to deepen No. 9 Taylor. No. 24 Taylor is drilling at 3,092 feet, and No. 1 Saunders is pulling liner to deepen. Leonard and associates' No. 1 Settegast is drilling at 4,765 feet. Moody Corp. has set strainer at 4,355 feet in No. 3 Hume. This company's No. 2 Whitehead is drilling at 3,610 feet. No. 1 Cooper is drilling at 4,275 feet. This company's No. 1 Marland fee, an old well being worked over, was being bailed as the week closed to test a sand at 4,680 feet. Rio Bravo Oil Co. is drilling below 4,100 feet in its No. 2 G.H.&S.A., and at 5,450 feet in its No. 101 G.H.&S.A. No. 8 Settegast is drilling at 3,342 feet and No. 7 around 4,000 feet. Rio Bravo is deepening its No. 1 P.S.A. and now is down 4,189 feet.

Goose Creek—Harris County

Gulf Production Co. is putting its No. 2 San Jacinto Bay on the pump after being deepened to a sand at 3,120 feet. This company's No. 19 Hoffman-Gaillard is drilling at 1,980 feet. Humble Oil & Refining Co.'s No. 73 Simms-Smith is drilling sand at 5,169 feet. This company has finished cleaning out the hole in No. 10 Sweet, an old well, and is drilling deper at 2,515 feet. No. 5 Gaillard is drilling at 2,520 feet. Inside screen has been set at 4,310 feet in No. 30 Gaillard Peninsula, while in No. 27 Gaillard tubing is being run. This well has been working over at 2,909 feet. No. 20-A Smith is washing at 2,436 feet. Powell Oil Co. is drilling at 2,625 feet in sidetracked hole. Lube Well Oil Co.'s No. 1 Dannenbaum is fishing at 1,600 feet.

Hull—Liberty County

Gulf Production Co.'s No. 83 Phoenix has been completed pumping 100 bbls. from sand at 3,650 feet. Empire Gas & Fuel Co. also worked over No. 27 Barngrover and put it on the pump for 45 bbls. at 3,089 feet. Gulf Production Co.'s No. 88 Phoenix is flowing 250 bbls. at 2,260 feet. No. 89 is drilling at 3,230 feet. Republic Production Co.'s No. 41 Dolbear is making some gas and oil from a sand around 2,400 feet, but has not been completed. This company's No. 94 Dolbear has been completed pumping and flowing 500 bbls. from sand at 2,710 feet. Republic has rigs up to deepen two more of its old wells, Nos. 73 and 104. The Texas Company and Vacuum Oil Co.'s No. 7 Hannah is drilling at 4,682 feet in a sidetracked hole.

Liberty—Liberty County

Navarro Oil Co. is drilling deeper in its No. 3 Harrison after encountering salt water at 3,375 feet. Sun Oil Co.'s No. 1 Mitchell is drilling around 3,000 feet. The Texas Company's No. 8 Monroe heirs has started drilling and is down below 200 feet. Yount Lee Oil Co.'s No. 2 Mitchell is drilling below 3,000 feet. All but Navarro's test are in the north extension of the South Liberty Pool recently opened. The Texas Company's No. 1 Green, 1½ miles north of production, is drilling below 1,000 feet.

High Island—Galveston County

Gulf Production Co. is getting ready to deepen its No. 2-A Smith, an old well. This company's No. 2 Smith is drilling at 4,860 feet. McLean Oil Co. has gone into its No. 6 Cade, which was been standing for several months, and as the week closed was swabbing, after having set strainer at 3,325 feet. This company's No. 6-C Cade is drilling at 2,590 feet.

Orange and Terry—Orange County

Great Southern Oil Co. has abandoned temporarily its No. 1 Bland at 3,125 feet. Gulf Production Co. also has abandoned its No. 21 Lee Hager fee after encountering salt water at 4,220 feet. This was an old well deepened, Rycade Oil Corp.'s No. 13-E State in Cow Bayou also looks like a salt water hole and probably will be abandoned at 4,798 feet. This is another old well deepened. As the week closed, it was bailing salt water. Gulf Production Co. has a rig up to deepen its No. 2-A Kishi-Lang, an old well, and is drilling at 3,350 feet in No. 6 Chessom. Sinclair Oil & Gas Co.'s No. 4 Granger is drilling around 3,350 feet. Sun Oil Co.'s No. 2 Brown is drilling below 5,780 feet.

Boling—Wharton and Fort Bend

Gulf Production Co. has completed No. 9 Chase, Wharton County, pumping 300 bbls. daily from sand at 1,400 feet. Southern Exploration Co.'s deep test, No. 1 Mullins, on the Wharton County side, is drilling below 3,900 feet. Texas Gulf Sulphur Co. and Weed-Gayle Oil Co. have abandoned a half dozen more shallow tests drilling in the cap rock area. On the northeast flank in Fort Bend County, Sun Oil Co.'s No. 5 H. R. Farmer is drilling below 1,000 feet. No. 7 on the same tract also is down below 900 feet. No. 5 J. R. Farmer is drilling around 3,100 feet, No. 6 around 700 feet, and No. 7 at 600 feet. No. 2 Kasparek is drilling below 1,000 feet.

SOUTH LOUISIANA

Lockport—Calcasieu Parish

Vacuum Oil Co. and Gulf Refining Co. have abandoned their No. 5 Farquahar as dry at 5,667. Their No. 3 on the same tract was unsuccessful in a fishing job and is sidetracking at 3,485 feet. The hole originally was drilled to a total depth of 3,485 feet. These operators are drilling plug in No. 4 State in Bayou D'Inde, and a test will be made of a sand at 4,716 feet. No. A-1 fee is drilling blue shale at 5,411 feet. No. 6 Bordages has been rigged up and a derrick has been completed for No. 1 State in Calcasieu River. A derrick is being built for No. 5 Lock-Moore.

Edgerly—Calcasieu Parish

Gilmer Oil Co.'s No. 1 Fairchilds, Section 28-9s-11w, is drilling around 1,200 feet. Green Oil Co.'s No. 9 Moore, same section, is drilling below 3,750 feet. It failed to make a well when bailed at 3,212 feet and is being deepened. Rex Petroleum Co.'s No. 8 Hunter, Section 21, also was unsuccessful when bailed at 3,398 feet and is being deepened. Wilson-Broach have cemented 4½-inch liner at 3,753 feet in No. 3 Wilson.

Vinton—Calcasieu Parish

Edgerly Petroleum Co.'s No. 11 Vincent, which tested salt water at 3,600 feet, is drilling deeper below 3,780 feet. Gulf Refining Co. has completed its No. 44 Star-Vincent pumping 150 bbls., 40 per cent sediment and water. Production is from sand at 2,470-72 feet. Marrs McLean is setting strainer at 2,100 feet in No. 1 G.&N.G. Seiss Oil Corp. also has set strainer at 2,635 feet in No. 5 Green. Vinton Petroleum Co.'s No. 9 Gordon is drilling below 3,200 feet, and No. 61 Gray below 2,400 feet.

Sulphur—Calcasieu Parish

Union Sulphur Co. is setting 10-inch casing at 1,330 feet in its No. 722 fee. Rigs also are being set up for Nos. 723 and 724.

Starks Dome—Calcasieu Parish

Gulf Refining Co. has started drilling in its No. 10 Industrial, Section 20-9s-12w, on the east side of the dome and Saturday was down 717 feet. No. 8 Lutcher-Moore on the north has a fishing job under way after drilling to 3,190 feet.

SOUTHWEST TEXAS

(Continued from Page 49)

in at approximately 3,000 feet. No. 1 Vance at 3,600 feet set 6¼-inch casing. No. 5 Fanny Heard set casing at 3,305 feet. No. 1 S. W. Heard, Refugio Survey, is making location. No. 2 A. W. Heard, Refugio Survey, is making location. No. 3 A. W. Heard, Refugio Survey, is located 150 feet to west line and 1,840 feet to south line, set 10-inch surface casing at 400 feet. No. 4 A. W. Heard, located 1,100 feet to west line and 1,600 feet to south line, is drilling at 2,510 feet. No. 1 Smith-Heard is standing at 2,510 feet. Satex Oil Co.'s No. 1 Wilson Heard has derrick up; has previously been reported as A. W. Heard. Houston Gulf Gas-Moody's No. 1 Wilson Heard milled through casing at 1,500 feet and tested salt water at 1,920 feet and is now drilling deeper. George Williams, trustee's, No. 1 Terrell, Martin Powers, 6 miles southwest of Refugio, is drilling at 1,925 feet.

White Point Field—San Patricio

Alamo Drilling & Leasing's No. 1 Hunter ordered out derrick lumber. Houston Oil Co 's No. 1 Humble is ready to drill in. No. 3 Humble, Roos, Block 7, located 200 feet to north line and 250 feet to east line, is rigging up. No. 4 Humble, Roos Survey, Block 19, located 1,858 feet west and 167 feet to south line, at 2,306 feet, is drilling; set 2,288 feet of 8¼-inch casing. No. 5 Humble is making location. No. 2 Ragsdale is shut down for repairs at 4,391 feet. No. 3 Ragsdale is making location. Satex Oil Co.'s No. 1 White Point Development Co., located 300 feet to north line and 600 feet to east line, is drilling at 1,950 feet; encountered considerable gas at 1,900 feet; will complete at 2,180 feet. No. 3 White Point Development Co. is making location. No 1 Hunter is building derrick.

COMPLETIONS

Caldwell County

The Texas Company's No. 6 Lackey, in Dale Field at 2,065 feet, made an initial flow of 150 bbls.

The Texas Company's E. A. Robuck, a wildcat test in Ben McCulloch Survey, was abandoned dry at 2,521 feet after topping the chalk at 2,516 feet.

Charles Hirtz's No. 1 Will Parr, in Byrd Lockhart Survey, a wildcat test, topped chalk at 1,392 feet and was abandoned at 1,422 feet, dry.

Dickinson & Smith's No. 1 Martin Callahan, in Willard Cooper Survey, was abandoned dry at 2,406 feet in the Edwards which it topped at 2,356 feet.

DeWitt County

McNeil & Mathews abandoned No. 1 Toland, dry at about 600 feet.

Medina County

Witherspoon Oil Co. completed No. 2 Tidal-Nixon in the Adams gas field with casing set at 982 feet gauging 17,600,000 feet of dry gas and rock pressure of 382 pounds.

Duval County

Humble Oil & Refining Co. abandoned No. 7 Walsh in Survey 185, at Piedras Pintas, at 4,505 feet. It is semiwildcat since only one well ever produced there and that has nearly gone dry.

Nueces County

Saxet Oil Co.'s No. 4 Dunn at 2,321 feet has been completed and is putting 2,000,000 feet of gas daily into Houston Gulf Gas Co.'s line. Other completions of Saxet Oil Co. not previously reported are No. 2 Weil at 2,680 feet, dry and abandoned. No. 2 Meaney at 3,216 feet, dry and abandoned. No. 3 Meaney at 3,234 feet, dry and abandoned. No. 1 Henry at 2,756 feet, dry and abandoned. All are in the territory south of Nueces Bay where the company has several producers.

San Patricio County

Saxet Oil Co.'s No. 8 Rachal at 2,534 feet, estimated at 30,000,000 feet of dry gas. No. 9 Rachal at 2,541 feet, estimated at 30,000,000 feet of dry gas. No. 10 Rachal at 2,178 feet, estimated at 20,000,000 feet of dry gas. No. 12 Rachal at 2,316 feet, estimated at 30,000,000 feet of dry gas. No. 2 White Point Development Co. at 2,180 feet, estimated at 20,000,000 feet of dry gas. All of these Saxet wells are in the White Point Field on the north side of Nueces Bay.

Ed Leach's No. 2 Collins, in Mathis gas field in western San Patricio County, completed at 2,350 feet a gas well. Size not reported.

Houston Gulf Gas Co.'s No. 1 Welder, near Sinton, a wildcat test, is dry and abandoned at 3,001 feet.

Huber & Crawford's No. 1 Mathis, in Block 17, of Maedgen tract in N. Delgavo Survey, a wildcat test, is dry and abandoned at 2,516 feet.

SOUTHWEST WILDCATS

(Continued from Page 49)

in Serpentine fields. The McMurtray well will probably lead to additional drilling, in an effort to find the plug.

Brandt and others' No. 1 Boyd in Caldwell County is dry and has been reported abandoned but the chances are that another test will be drilled within a quarter of a mile or so of the first. The No. 1 Boyd was first reported as the Doctor Butte well.

San Patricio Gasser

Classed partly as wildcat because of the first tests resulting disastrously, No. 2 Collins of Ed Leach in western San Patricio County has been completed as a gas well at 2,350 feet. Plateau Oil Co.

and Texas Pacific Coal & Oil Co. more than two years ago completed two or three wells that for a time supplied gas to the line to San Antonio but later went bad. Leach drilled in a new direction and his No. 1 Collins looked like a success until it went to water. Now No. 2 Collins is in and it looks like a success. A try out on the Southern Gas Co. line to San Antonio will probably prove it out soon.

Houston Gulf Gas has abandoned No. 1 Welder in San Patricio County near Sinton at 3,001 feet, the contract depth. The lease of 50,000 acres calls for at least two more tests within the next 12 months.

What amounts to a wildcat test is the Houston Oil Co.'s No. 2 Ragsdale in the White Point Field in San Patricio County. At 4,391 feet it is exploring hitherto untouched sands in that territory. Houston Oil Co. is now an enormous consumer of natural gas and this fact is causing it to keep up an active drilling campaign throughout Southwest Texas to keep a supply ahead of demands.

Humble Oil & Refining Co.'s No. 7 Walsh in Duval County on the Piedras Pintas salt dome has been abandoned at 4,502 feet a salt water well. Salt water started coming in when the well was washed and before it was bailed. Humble has put a lot of money and months of time on the Piedras Pintas salt dome in Duval County. No. 4 Walsh came in a gusher making a lot of gas and quite a little very high gravity oil and then soon settled to a pumper and later became unprofitable as a pumper. It is now seeping out a barrel or so a day. Several wells were drilled all around it but they failed to develop a pool and now No. 7 is also a disappointment.

Duval County

National Oil Co.'s No. 1 Ball, Survey 16, located 450 feet to north line and 150 feet to east line, is drilling at 1,060 feet. Houston Oil Co.'s No. 1 Woods-Welder, Survey 233, located 1,750 feet to west line and 100 feet to north line, has set surface casing at 400 feet.

Jim Hogg County

M. I. Shaw and others' No. 1 Jones, Survey 381, Block 12, located 171 feet to south line and 486 feet to west line, is drilling at 1,785 feet.

Starr County

The Texas Company's No. 1 M. Guerra is location in Porcion 68, Block 91; No. 1-A V. Guerra, Porcion 68, Block 92, is moving in rig. Kusch Exploration Co.'s No. 1 Frank Doyno and others, Porcion 75, Block 13, is drilling in rock at 540 feet. Clark & Woodruff's No. 1 Kelsey, Porcions 75, 76, 77, is drilling at 530 feet. Harston and others' No. 1 H. Guerra, Survey 43, located 660 feet to south line and 1,320 feet to east line, is standing at 1,120 feet. Deckle & McCarley's No. 1 Garcia, Survey 918, located 150 feet to south and west lines, standing for six months or more at 1,098 feet, is preparing to resume drilling.

Atascosa County

Eckert and associates' No. 1 C. T. Tom, located 2,700 feet west of Highway 2,500 to north line of farm, is drilling. Sam Draper's No. 1 McCoy, W. S. Stilwell Survey, is making location. Lumberman Oil Co.'s No. 2 Milgrim, Survey 79, is making location. Lumberman Oil Co.'s No. 1 Williams, Survey No. 275, Section 92, is making location. Lumberman Oil Co.'s No. 1 Stephens, Survey No. 6, Section 281, is making location.

Bexar County

Allen Burman's No. 1 L. Ward, A. A. Gardiner Survey, 1,200 feet to east line and 325 feet to south line, is drilling at approximately 1,000 feet. Laresen Walsh and others' No. 1 Oppenheimer, William Miller Survey No. 180, located 330 feet to south line and 330 feet to CEL, is drilling through rock at 100 feet.

Bastrop County

Mrs. McMurtray's No. 1 B. L. Duran, L. Flint Survey, 150 feet to northwest line and 900 feet to southwest line, at 2,280 feet drilling in Taylor marl. James O'Hare is preparing to deepen old Pritchett well at 1,950 feet. B. W. Owens' No. 1 Ed Jones, Miller & Kimbro Survey, 150 feet to north and east lines of tract, is rigging up.

Bee County

D. Hewitt's No. 1 G. A. Ray, G. A. Ray Survey, 1½ miles north of Pettus, at 2,303 feet has moved in heavier machinery. D. Hewitt's No. 1 Schultz, 3½ miles north of Red Ant Co.'s No. 1 Perry drilling at 650 feet. F. Nicholas' No. 2 Hicks-Hall, 1½ miles south of Normanna, is rigging up. W. S. Poole's No. 1 J. C. Wood, 5 miles southeast of Beeville, is location. Red Ant Oil & Gas Co.'s No. 1 Perry & Chesnut, B. Q. Hadley, 450 feet to east line and 1,600 feet to south line, is drilling.

Blanco County

C. W. Bates' No. 1 Herman Massey, Henry Manton Survey, 920 feet to north line and 660 feet to east line of survey, is changing to larger walking beam. Robert A. Rodson's No. 1 Glasscock, W. M. McDonald Survey No. 50, 150 feet west of center of east line of survey, is drilling at 390 feet.

Caldwell County

Brandt and others' No. 1 R. W. Boyd, J. R. Miller Survey, 6 miles south from Lockhart, is 2,253 feet in Buda, previously reported as Doctor Buttes' No. 1 Boyd, topped chalk at 1,937 feet. Lu-Tex Oil Co.'s No. 1 Wilson, A. Floyd Survey, 2,320 feet to east line and 200 feet to south line, 2 miles northeast from Luling; surface casing set at 40 feet. Detex Oil Co.'s No. 1 Hardeman, 4 miles north of Luling on Lockhart road, is shut down at 3,075 feet. H. C. Ratcliff's No. 1 Briscoe, J. Hindes Survey, is rigging up. Ratcliff's No. 1 J. L. New, James Hindes Survey, 150 feet east of the west line and 600 feet north of the south line, is shut down in Edwards lime.

Dewitt County

Durbin Oil Co.'s No. 1 Gohmert, G. W. Brooks league, 175 feet to the north line, 300 feet to east line, total depth 2,310 feet, is ratholing. Empire Southern Oil Co.'s No. 2 Smith, Survey No. 3, is shut down at 3,150 feet. H. T. Roe's No. 1 A. F. Lienhard, D. J. Bibb Survey, is shut down at 950 feet.

Dimmitt County

Humble Oil & Refining Co.'s No. 1 City National Bank, Survey No. 654, located 700 feet to north line and 2,000 feet to east line, at 5,004 feet is dry; will be abandoned but will test some sands passed in drilling.

Edwards County

Devil's River Oil Co.'s No. 2 Turney, C. C. S. D. & R. G. N. G., Section 167, is located 2,040 feet to north line and 660 feet to west line and 600 feet north of No. 1, is shut down at 440 feet with oil showing at 390 feet.

Frio County

Karnes and others' No. 1 J. J. Little is shut down at 607 feet. F. A. Lain's No. 1 Edwards Hooper & Wade Survey, 920 feet south of center of north line of survey, is shut down at 1,250 feet; work to be resumed soon. P. A. Neilman's No. 2 Blackaller, James Gouley Survey, is shut down at 2,950 feet.

Fayette County

National Oil Co.'s No. 1 J. C. Melcher, S. M. Williams League No. 1, located 300 feet from north and east lines of farm, is moving in machinery.

Williams & Phalon's No. 1 Cervenka, Fayette County School Land, Block 97, derrick and rig on ground.

Goliad County

C. W. Simpson's No. 1 Ideus, W. H. Pendleton Survey, 156 feet to north line and 540 feet to west line, is shut down at 2,323 feet.

Gonzales County

J. B. Dunning & Pierce's No. 1 Wilkerson, R. Ward Survey, located 150 feet south of center of north line, is drilling. W. D. Flynn's No. 1 Wilhausen, S. Bateman Survey, in east central part of lease, is drilling at 800 feet. Green & Shall's No. 2 Dubose, J. Pratt Survey, 350 varas north of center of south line, is shut down for fuel at 2,700 feet. L. L. Jones and others' No. 1 Campbell, Moore & Bridges Survey, southwestern corner, is shut down at 1,980 feet. W. G. Malone's No. 1 Mrs. D. G. Staton, 3½ miles south from Slayden, is drilling water well in preparation to starting test for oil. L. P. Unkel's No. 3 Johnson, C. H. Jaeger Survey, 240 feet to southwest and 120 feet to southeast line, is drilling in gumbo at 1,000 feet.

Guadalupe County

O. W. Killam's No. 1 J. W. Calvert, Fulcher Survey, 110 feet to north line and 1,250 feet from west line, is drilling at 509 feet.

Hays County

Orren Estess and J. H. Moore's No. 1 C. N. Sledge, Hunter and Jones Survey, 285 feet to northwest line of farm, 310 feet northeast of southwest corner of Herzog 10-acre tract, derrick is completed and rig is moving in.

Jackson County

J. B. Douglas' No. 1 C. O. Lawrence, 12 miles northwest from Edna, has derrick up.

Reynosa Oil Corp.'s No. 2 Butler, Block 43, Reynolds Plat, 1,000 feet south of No. 1, is fishing at 2,007 feet.

Kerr County

Walker Van-Duyn's No. 1 Barfield, B. B. Peck, 4,700 feet to north line and 450 feet to east line, is underreaming at 2,010 feet.

LaSalle County

E. V. Chenoweth's No. 1 fee, Survey 58 G. Manchace, in the north central part of lease, has been spudded in. Francis C. McCarty's No. 1 R. C. Sutton, Survey 36, 250 feet south and 1,500 feet to west lines, is rigged up.

Live Oak County

War. Hood Hunt's No. 1 B. McNeil, Jane Curry Survey, 4,000 feet west of northeast corner and 3,000 feet southeast of northwest line, is drilling at 1,890 feet. Houston Oil Co.'s No. 2 Brown Land & Cattle Co., is drilling at 2,087 feet. Houston Oil Co.'s No. 19 Cartwright, W. J. Cannon Survey, 1,500 feet northeast of No. 17, is rigged up. Houston Oil Co.'s No. 22 H. Cartwright, F. Botillo Survey, is making location. Simmons Oil Co.'s No. 3 Reagan is fishing. Simmons Oil Co.'s No. 2 McGriff, has spudded in. Simmons Oil Co.'s No. 4 Sartain is shut down at 2,303 feet changing to heavier rig; will drill to 3,000 feet. Simmons Oil Co.'s No. 2 Reagan, 1,320 feet east of No. 1, is shut down. In Simmons Oil Co.'s No. 1 McGriff, near Oakville, 200 feet to north line and 1,080 feet from the east line, gas blew out at 256 feet and it is estimated as a commercial well.

Medina County

Pat M. Armstrong's No. 1 Louis Mangold, Survey No. 62, 200 feet to east and south lines of the southwest 160 acres of Mangold farm, is drilling at 700 feet. F. Banderet's No. L Mofield, Survey No. 532, 550 varas to east line, 950 varas to north line of survey, is shut down. Chacon Oil Co.'s No. 2 Jungman, Survey No. 31, 1,500 feet to east line and 500 feet to south line, is standing at 1,675 feet; had showing of oil at 1,560 feet and may plug back and test. California-Medina's No. 1 Rothe is shut down at 3,270 feet. Medina Oil Co.'s No. 1 Taylor, A. Bruchet No. 135, is shut down at 1,230 feet. Morgan-Walsh's No. 1 Haby, L. A. Haby No. 50 1-2 Survey, 330 feet to west line and 600 feet to south line of survey, is waiting for surface casing. R. P. O'Brien's No. 1 J. P. Nixon is shut down at 1,680 feet. Cecil Switzer's No. 1 Zerr, Survey 459 Juan Jose Cassonova, in west central part is shut down at 3,485 feet.

Maverick County

Ryan Consolidated Petroleum Co.'s No. 1 Indio, Survey 14, Bryan, 18 miles from Eagle Pass, has set 8¼-inch casing at 4,270 feet. Rycade Oil Co.'s No. 1 Chittim, Block 7, Section 129, is shut down for water at 4,296 feet. Rycade Oil Corp.'s No. 2 Chittim, Block 158, Survey No. 7, 350 feet to north line and east line, is drilling at 3,600 feet.

McMullen County

Houston Gulf Gas Co.'s No. 1 Lark, O'Boyle Survey, is shut down temporarily at 1,500 feet.

Refugio County

George Williams, trustee's No. 1 Terrell, Martin-Powers Survey, 6 miles southwest of Refugio, is drilling at 1,925 feet.

San Patricio County

Ed. R. Herwick's No. 1 Tsesmelis has spudded in. Houston Gulf Gas Co.'s No. 1 Welder, 200 feet south of Chillipin Creek, about 2 miles east of Sinton reached contract depth at 3,001 feet and is being abandoned. Ed Leach's No. 2 Collins, Edward McGloin Survey, southeast one-fourth of Section 39, is in sticky shale at 1,950 feet. George B. Pickett's No. 1 Whitworth in NW NW, Section 60, of Coleman Fulton Pastore Co. Survey, is drilling below 2,600 feet. George B. Pickett's No. 1 J. E. Garrett, Taft Survey, Block 23, 1,500 feet to west line and 1,000 feet to south line, has shut down at 3,030 feet. National Oil Co.'s No. 1 J. E. Sullivan, J. C. McMullen Survey, 500 feet to southwest corner at 1,805 feet has resumed drilling. John Sigmund's No. 10 Robinson is 60 feet south of No. 9 on shallow structure and has set and cemented surface casing.

Travis County

Roy Clark's No. 1 Schrivner, J. B. Hurd Survey, is drilling at 325 feet. T. P. Garrett's No. 1 Rowe, R. Hornsby Survey, 900 feet to north and east lines, is drilling in lime at 1,000 feet.

Uvalde County

Pure Oil Co.'s No. 1 J. D. Smythe, Survey No. 687, 700 feet north and 140 feet east of southeast corner of Survey No. 20 in southwest corner of Uvalde County, at 1,678 feet is underreaming to lower 12-inch casing; it topped lime, supposed to be Buda, at 1,605 feet.

Victoria County

J. J. Elam's No. 1 Vol Kutchka, 200 feet to CNL of Section 40, is shut down at 1,000 feet waiting on drill stem. Humble Oil & Refining Co.'s No. 1 Jaeggli is drilling at 595 feet; No. 1 Welder is drilling in gumbo at 1,163 feet. R. M. Talbot's No. 1 J. K. Reeves Estate, J. K. Reeves Estate Survey, 2,000 feet to west line is shut down at 1,825 feet.

Val Verde County

East Del Rio Oil Co.'s No. 1 Whitehead, Survey No. 183, is shut down at 3,210 feet. Magnolia Petroleum Co.'s No. 1 Whitehead, Survey No. 81 G. S. & S. F., 1,900 feet to west and 900 feet to south line, is drilling at 6,020 feet. O. O. Owens and others' No. 1 Mills, Section 128, Block 1, is shut down at 4,210 feet. W. V. Traves' No. 1 Wilson, Section 115, is shut down at 905 feet.

Zavala County

J. G. Pundt's No. 2 West is making location. Witherspoon Oil Co.'s No. 1 West, 200 feet northeast of Sun well, is drilling at 210 feet.

LOUISIANA-ARKANSAS

(Continued from Page 46)

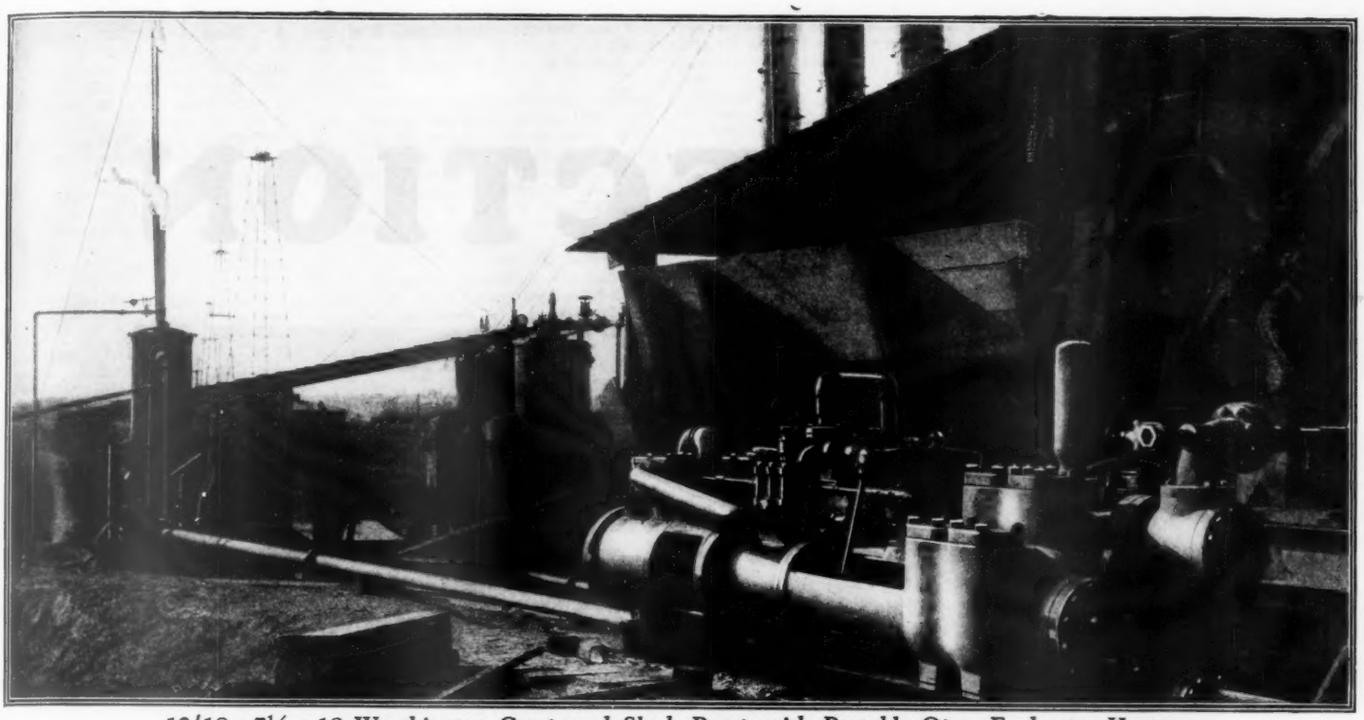
May 10, 1926, as a small pumper at 1,553 feet, and is rigging up to deepen it to the Blossom sand at around 1,800 feet. R. O. Roy began drilling No. 7 Caplis, Section 26-16-12, Feb. 12, and is down 200 feet.

Caddo Parish

Greenwood—Belchic and Laskey are taking cores at 1,150 feet in No. 14 R. T. Sharp, Section 10-18-16. Magnolia Petroleum Co. cemented 9¼-inch casing at 990 feet in No. 2 Bell, Section 4-17-16; No. 1 J. W. Furrh, Section 28-18-16, is coring shale at 2,680 feet.

Pine Island—Dixie Oil Co. No. 81 Dillon, Section 13-21-15, an old producer being deepened from 3,775 feet, is in shale and lime at 3,961 feet; No. 90 Dillon in Section 14-21-15 is waiting on standard rig to pump from 4,054 feet as a second completion having been a 10,000,000-foot gasser at 3,683 feet; No. 91 Dillon in the same section is rigged up ready to drill after standing as a derrick since last November, and No. 92 Dillon in Section 13-21-15, is in lime at 3,981 feet. No. 4 Huckaby, Section 11-21-15, was not left as a completion pumping 80 bbls. from 3,890 feet, but the rig was moved off and it has been rigged up to go deeper, drilling at present at 3,093 feet.

Magnolia Petroleum Co.'s No. 8-A Hampton, Section 15-21-15, is in lime at 3,855 feet; No. 22 Robertshaw, Section 23-21-15, in the same formation at 3,821 feet. Pittsburg Oil & Development Co. No. 1 Herndon, Section 15-21-15, cemented 5⅞-inch casing at 4,004 feet to make a test of 7 feet of sand, total depth 4,017 feet. D. C. Richardson estate has begun drilling No. 6 Youree Randolph, 640 feet east of the center of Section 13-20-15, set



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10-inch surface casing at 101 feet and is drilling at 300 feet. Simplex Oil Co. No. 2 Baird, Section 22-20-15, is drilling at 2,100 feet. The Texas Company's No. 9 A. Herndon, Section 14-21-15, is drilling sandy lime at 3,894 feet; No. 13-B Noel, Section 14-21-15, is in red sandy shale at 3,978 feet, rather deep—and No. 19 D. H. Raines, Section 15-21-15, is still fishing for lost drill stem, total depth 4,457 feet.

Oil City—Standard Oil Co.'s No. 12 A. L. Barry, Section 11-20-16, bailed dry at 1,491 feet after setting 6-inch casing at 1,443 feet for a test which yielded only a slight show of oil and is going deeper.

Monroe District

Morehouse Parish—Moody & Seagraves' No. 1 Wolf & McInnis, Section 13-20-4, began drilling Feb. 10, set 10-inch surface string at 165 feet and is drilling at 200 feet. The Texas Company's No. 1 Myers, Section 15-22-7, is shut down at 2,245 feet waiting for fuel.

Ouachita Parish—Coco Bend Oil & Gas Co.'s No. 1 Cordell, Section 23-15-3, is drilling at 2,560 feet. Imperial Oil & Gas Co. has made location 600 feet north and 250 east SW cor. Section 13-19-3, for No. 5 Stubbs and is rigging up. Jordan Drilling Co.'s No. 2 McGee, Section 10-18-4, is drilling at 2,100 feet and No. 1 Pereboom, 1,970 feet west and 660 north SE cor. SW, Section 32-19-4, is a derrick. Moody & Seagraves' No. 1 U. S. Gov't, Section 1-19-3, is drilling at 2,142 feet. Ouachita Natural Gas Co. is drilling No. 8 Smith, Section 37-19-4, at 2,100 feet. Palmer Corp.'s No. 2 Central Real Estate, Section 1-19-4, is drilling at 1,630 feet. Peerless Carbon Co. No. 3 Moore, Section 49-20-4, is drilling at 2,015 feet. United Carbon Co. has cemented 8-inch second string at 440 feet and is drilling at 1,530 feet on No. 2 Nelson Fee, Section 6-19-5, and J. P. White is rigging up on No. 1 Schmidt, 95 feet east and 187 south NW cor. in Section 3-15-4.

Union Parish—Barbour Oil Co. No. 1 Tugwell, Section 21-22-1e, is drilling gummy lime at 2,213 feet. Carter & Goodwin began drilling No. 1 Hudson (formerly No. 6 Hudson) section 7-23-1e, Feb. 10, and have set 10-inch surface casing at 102 feet, leaving No. 1 Security Trust in Section 7-23-1e shut down at 2,250 feet with the hole full of salt water, as it has been since December 21. Industrial Gas Co. started drilling No. 2 Hill, Section 9-20-3, Feb. 13, and has set 12-inch surface string at 187 feet. Moody and Seagraves have rig up on No. 1 Robertson, Section 34-23-3. Natural Gas & Producing Co. cemented 6-inch casing at 2,067 feet in No. 1 Waldrop, Section 7-21-3. John Potts' No. 1 Bernstein, Section 30-20-4, has 6-inch casing cemented at 2,105 feet. Ruston Drilling Co. No. 1 Steel, Section 36-20-3, cemented 8-inch at 830 feet and is drilling at 2,100 feet.

Richland Parish

Gulf Refining Co.'s No. 3 Rhymes, Section 28-17-6, is shut down to change to heavier rig, total depth 2,005 feet. Moody & Seagraves have rig up to drill No. 1-B Sartor, Section 9-16-6, and for No. 1-C Sartor, Section 17-16-6. Natural Gas & Fuel Co.'s No. 2-A and 3-A Thompson, Section 21-16-6, began drilling Feb. 13, set 20-inch surface casing at 20 feet and are drilling at 150 feet. Both are being drilled as emergency relief wells to fight their No. 1 Thompson, half way between them, which has been running wild for the past two weeks. Ruston Drilling Co.'s No. 1 Sartor, Section 17-16-6, is drilling close to the pay at 2,430 feet. Southern Carbon Co.'s No. 2 Sartor, Section 20-16-6, is drilling at 2,070 feet and No. 1 Spann, Section 8-16-6, is down 1,880 feet. United Carbon Co. set 6-inch casing at 2,279 feet in No. 1 Mulhern, Section 20-16-6.

Sabine Parish

Ruffin and others' No. 1 McElroy is in lime at 3,008 feet.

Webster Parish

Cotton Valley—C. H. Lyons and others cemented 6⅝-inch casing at 2,650 feet in No. 1 Sexton, Section 36-21-10. Magnolia Petroleum Co.'s No. 1 G. W. Cole, Section 27-21-10, is waiting on 6⅝-inch casing to be set 4,340 feet. No. 1 D. G. Cox, Section 22-21-10, is in lime at 4,218 feet and No. 1 J. M. Mixon, Section 22-21-10, is in lime at 4,025 feet. Ohio Oil Co. is in anhydrite at 4,119 feet with No. 38 Bodcaw, Section 15-21-10, and No. 2 Crichton, Section 21-21-10, is in shale at 3,958 feet.

Sarepta and Shongaloo—Arkansas Natural Gas Co. has made location for No. 1 Mitchell, its second well in north Webster gas territory, in the center SE SE, Section 30-23-9. C. H. Lyons and others' No. 1 Porter-Wadley Lumber Co., Section 36-23-10, is drilling at 2,100 feet. Magnolia Petroleum Co. made location for No. 1 C. O. Bailey, 600 feet east and 150 north, SW cor. NW NE, Section 29-23-9. Magnolia Petroleum Co. has derrick up for No. 1 Camp, Section 36-23-10, reported last week as a location; No. 1 H. L. Munn, Section 29-23-9, is arranging for a second test at 1,705 feet, having pulled liner to deepen a few feet after testing 7,790,000 of gas at 2,700 feet; No. 1 J. L. Munn, Section 36-23-10, is waiting for liner to be set at around 2,685 feet to test 5 feet of sand, total depth 2,689 feet; No. 1 R. J. Munn, Section 29-23-9, is drilling at 975 feet. The Sun Co., a new entry in north Webster gas territory so far as drilling is concerned, has made location for No. 1 Haines in the center NE NE, Section 30-23-9.

ARKANSAS

Ouachita County

Smackover—Little Fay Oil Co. began drilling No. 4 Robertson, SW cor. SW NW, Section 25-15-16, Feb. 10, set 10-inch surface casing at 65 feet and is drilling at 300 feet. Ohio Oil Co. has set 161 feet of 12½-inch casing on No. 7 Cramer, SW cor. W half, Section 22-15-16, which began drilling February 10.

Union County

El Dorado—Mountz and others' No. 6 Pratt in Section 8-18-15, shut down from July 13, 1927, to February 1, 1928, after recementing 6-inch casing at 2,146 feet, had a show of oil and gas at 2,147 feet but passed it up and is drilling deeper.

Champagnolle—Eddie Jones' No. 3 Crain, Section 2-17-14, shut down at 3,670 feet for the past two weeks, has resumed operations and is coring sandy shale at 3,826 feet, the deepest hole in the district by 700-odd feet. Magna Petroleum Co. No. 1 Rowland, Section 14-17-14, made a test of 4 feet of sand, 2,995-99 feet and got 13 fourbles of mud with one fourble of oil at the bottom and has cemented 6⅝-inch casing at 2,992 feet for a more thorough test. Oilwell Corp. and Magna Production Co. did not complete No. 1 Dumas, Section 11-17-14, as reported last week, but pulled liner set at 3,069 feet and after coring red shale at 3,069-72 feet, is bailing salt water at 3,099 feet; No. 1 Townsend, Section 10-17-14, was dry at 2,829 feet, cored a salt water sand immediately below and is temporarily abandoned at 3,047 feet. Pure Oil Co. is fishing for one joint of drill stem, drill collar and bit lost at 2,552 feet in No. 1 Gregory, Section 10-17-14. Rushing and others' No. 1 E. F. Gregory, Section 11-17-14, cemented 6⅝-inch casing at 2,735 feet, total depth 2,552 feet in No. 1 Gregory, Section 10-section is drilling at 1,900 feet. Simmerall and others' No. 1 Finley, Section 12-17-14, a possible extension east, is arranging for a drill stem test at 2,710 feet.

Smackover—Laurel Oil & Gas Co. will drill plug during the coming week at 2,725 feet to test No. 1 Houston, Section 12-16-16. Lion Oil Refining Co.'s No. 1 Leverett, Section 11-16-16, is drilling at 2,735 feet and No. 7-D Murphy, Section 8-16-15, is waiting on standard rig to pump with 500 feet of fluid standing in the hole, total depth 2,781 feet with casing plugged back to 2,658 feet and perforated.

EAST TEXAS

Harrison County—Cox and others' No. 1 Furrh in the James Short survey set 10-inch surface casing at 100 feet, 6-inch at 997 feet, bailed dry at 1,020 feet, and is shut down waiting orders. Magnolia Petroleum Co. tested 500,000 feet of gas at 1,911 feet and is arranging to deepen No. 1 A. G. Vincent in the R. W. Bedford survey. State Line Oil & Gas Co.'s No. 6 Waterman in the E. Pollock survey, had 200,000 feet of gas on test at 2,836 feet, resumed drilling and is coring red shale at 2,866 feet. Tylong Oil & Gas Co.'s No. 1 Armstrong in the Simpson Holloway survey, is coring at 1,984 feet.

Panola County—Hines and others' P. W. Baker in the George Goodwin Survey set 10-inch surface casing at 105 feet and is drilling at 1,600 feet. Magnolia Petroleum Co. No. 3 Ella Baker, B. C. Jordan Survey, is waiting for 8¼-inch cement plug to set at 970 feet; No. 14 C. G. Steel, B. C. Jordan Survey, is reaming to bottom at 1,920 feet; No. 1 E. C. Tillery in the Jane Thorpe Survey is coring a gray sand at 1,929 feet; No. 1 Leigh Trosper, B. Stevenson Survey, is coring shale at 1,943 feet. D. Thomason and others' No. 3 Crenshaw in the John Womack Survey is drilling at 1,700 feet after showing for 500,000 feet of gas at 1,007 feet.

KANSAS FIELDS

(Continued from Page 44)

SW, Section 12-33-5, has been abandoned at 717 feet. Pryor & Lockhart's No. 1 Gearhart, NE cor. NW SE, Section 31-34-7, is dry and abandoned at 3,464 feet.

Elk County

Truby and others moved a machine out for No. 1 Silger, SE cor. NE SE, Section 25-30-10. Pennock Oil Co. has a machine at the location for No. 1 Faulk, NE cor. SW, Section 36-30-10. Union Gas Corp.'s No. 23 Webb, C NE NW, Section 14-31-10, is drilling at 300 feet. Blaudell Oil Co.'s No. 2 Baker, CNL NW NW, Section 28-31-10, is drilling at 1,350 feet. Denman Brothers' No. 2 Warren, SW cor., Section 36-31-10, is down to 1,300 feet and drilling ahead.

Elk Petroleum Co.'s No. 1 Denton, NE cor. SE, Section 4-30-9, had sand 2,305-28 feet and drilled to 2,405 feet then plugged back to 2,328 feet and produced 200 bbls. after the shot. Union Gas Corp.'s No. 1 Vick, C NE SW, Section 2-31-10, is a dry hole at 2,025 feet. Hood and others' No. 2 Eyman, CNL SE SE, Section 9-31-10, is making 10 bbls. from sand 2,008-14 feet. Theta Oil Co.'s No. 3 Marshall, SW cor. SE SE, Section 27-31-10, has been abandoned at 2,296 feet.

Geary County

Brinkley and others' No. 1 Fawley, NE cor. NW NE, Section 16-10-5, is dry and abandoned at 2,501 feet.

Greenwood County

Darby Petroleum Co.'s No. 7 Schwab, SE cor. SW NW, Section 30-22-13, is a rig under construction. The rig material is on the ground for No. 8 Schwab, SW cor. SE NW, Section 30-22-13. Transcontinental Oil Co. made location for No. 1 Fankhouser, NE cor. NW, Section 2-23-12. Reed & Wilson made location for No. 1 House, NE cor. SW SW, Section 28-26-9. Mohawk Oil Co. made location for No. 2 Cross, NE cor. SW NE, Section 7-27-11.

Transcontinental Oil Co.'s No. 2 Pixlee, SE cor. NE NE, Section 10-22-10, is a dry hole at 2,197 feet.

The Prairie Oil & Gas Co.'s No. 1 Webber, SE cor. NE SE, Section 9-25-13, has been abandoned at 1,600 feet. Darby Petroleum Co.'s No. 5 Schwab, NE cor. SW NW, Section 30-22-13, was shot with 260 quarts and is making 375 bbls. from sand 1,681-1,742 feet. Christy and others' No. 1 Christy, SW cor. NW, Section 31-24-13, was completed for 10 bbls. in sand 1,665-88 feet, total depth 1,689 feet. Rogers and others' No. 1 Brown, NE cor., Section 3-26-10, is making 30 bbls. from sand 1,960-65 feet. Mohawk Oil Co.'s No. 1 Cross, SE cor. NW NE, Section 7-27-11, was completed for 20 bbls. in sand 1,911-12 feet.

Marion County

The Prairie Oil & Gas Co. made location for No. 2 J. T. Mowrer, NE cor. SE NE, Section 21-17-4, Lost Springs Pool. The rig is being moved in for No. 1 Anna Mowrer, SE cor. NE NE, Section 21-17-4. Crawford and others' No. 1 Weston, NE cor. NW SW SE, Section 14-17-4, is rigging.

Rooks County

Derby Oil Co.'s No. 1 Kruse, NE cor. NW NE, Section 3-10-16w, made 35 bbls. from sand 3,075-3,141 feet.

Russell County

Midwest Exploration Co. made location for No. 33 Austin, SE cor. SW SE, Section 30-12-15w. Keys Petroleum Co.'s No. 1 Baxter, SW cor. SE SE, Section 32-13-15w, is drilling at 3,100 feet. No. 2 Baxter, NW cor. SE SE, Section 32-13-15w, is a rig on the ground. The location has been made for No. 1 Mermis, SE cor. SW NE, Section 32-13-15w. No. 4 Mermis, NE cor. NW SE, Section 32-13-15w, is also a location. Streeter & Stearns moved the rig out for No. 1 Gorham, SW cor. NE, Section 33-13-15w. Keys Petroleum Co. made location for No. 1 Mermis, NW cor. SW SW, Section 33-13-15w.

Saline County

Mentor Oil & Gas Co.'s No. 1 Muir, SW cor., Section 17-15-2w, is dry and abandoned at 3,501 feet.

Sumner County

Roxana Petroleum Corp. has the rig on the ground for No. 1 Barnes, NE cor. SW SW, Section 14-32-2. No. 4 Taton, SW cor. NE NW, Section 36-31-2, was shot with 80 quarts and made 689 bbls. from sand 1,840-1,901 feet. Mead and others' No. 1 Emerich, Tract 5, Oxford Townsite, Section 14-32-2, made 288 bbls. from sand 2,008-90 feet. Palmer & Barnsdall Oil Co.'s No. 1 Wenerich "A", NE cor. NW, Section 23-32-2, has been completed for 50 bbls. in sand 1,285-1,305 feet.

Trego County

Central Commercial Oil Co.'s No. 1 Ellis-King, NE cor. SW NE, Section 20-13-21w, is spudding.

Wabaunsee County

Doric Oil Co.'s No. 1 Jones, NE cor. SW, Section 24-11-10, has drilled to 1,530 feet and shut down. Empire Oil & Refining Co.'s No. 1 Schwalm, SE cor., Section 19-12-11, is a dry hole at 3,438 feet.

OKLAHOMA FIELDS

(Continued from Page 44)

5-8, flowed 576 bbls. from sand at 2,583-2,608 feet.

Stephens County

Carter Oil Co.'s No. 2 Morgan, SW cor. NW NE, Section 32-1-8w, is rigging standard tools to deepen from 2,312 feet. Big Twelve Oil Co.'s No. 5 Taliaferro, SE cor. SW, Section 27-1s-8w, an old gas well, is rigging up to deepen. Amerada Petroleum Corp.'s No. 2 Hanson, SE cor. SW, Section 12-1s-4w, is a rig on the ground. Pace and others moved the tools in for No. 7 Absner, NW cor. Section 7-3s-7w.

Harry Hanbury's No. 6 Taliaferro, SE cor. NW SW, Section 27-1s-8w, is making 10 bbls. from sand at 2,208-10 feet. David Malernee's No. 1-A Burke, NW cor. NE NE, Section 34-1s-8w, has been abandoned at 2,300 feet. Touhy and others' No. 2 Edwards, SW cor. SE SE, Section 3-3s-5w, was completed for 10 bbls. in sand at 1,500-62 feet.

Wagoner County

Linden & Davis' No. 1 Taylor, SE cor. NW SW, Section 20-18-15, is dry and abandoned at 1,300 feet. A. Chapman's No. 2 Colbert, SW cor. NE SE, Section 19-18-18, has been abandoned at 910 feet. Peterson & Young's No. 1 Marshall, C SW SE, Section 23-16-16, is dry and abandoned at 1,015 feet. R. H. Ford & Silsbee's No. 1 Colbert, CSL SW NW, Section 3-16-18, has been abandoned at 500 feet.

Greater Seminole Area

The production of the Greater Seminole area by companies and leases on Friday, February 17, is given below:

Little River

	Wells	Prod.
Amerada:		
Fore	2	1,025
Nitey	4	3,925
Barnsdall:		
Hotulke	1	55
Blackwell:		
Nitey	7	2,911
Carter:		
Fish	5	1,905
Jackson	1	100
Continental:		
Cosar	2	875
Gypsy:		
Brown	1	50
Campbell	2	190
Nungee	1	45
Pottey	3	572

Independent:		
Harris	1	108
Davis	1	2,020
Indian Territory:		
Campbell	1	152
Dungan	3	2,663
House, M. A.	1	217
House, W. E., "A"	1	38
House, W. E., "B"	3	1,700
Jackson	3	2,227
McCulla	3	1,026
Nitey	7	1,537
Phoebe "A"	3	790
Phoebe "B"	3	447
Reed	1	46
Sokelheche	4	1,016
Hull	1	124
Magnilia:		
Cruse	1	720
Pottey	2	512
Mid-Continent:		
Wadsworth	7	1,080
Smith	1	40
Pine and Phillips:		
Pottey	2	1,043
Prairie:		
Dungan	2	120
House	4	2,215
Roxana:		
Smith	1	10
Shaffer:		
Cosar	2	1,630
Superior:		
Wadsworth	1	18
Snowden & McSweeney:		
Tiger	1	87
The Texas Company:		
Coker	3	625
Tidal:		
House	3	1,575
Johnson	1	75
Total	97	34,514
Maud		
Barnsdall:		
Fife	1	0
Indian Territory:		
State	1	0
Total	2	0
Bowlegs		
Amerada:		
Rasco	8	2,810
Atlantic:		
Baker	4	689
Fleet	4	632
Grayson	3	1,069
Jones, A.	3	120
Jones, C.	2	357
Barnsdall:		
McNac	1	30
Murrow	4	880
Carter:		
Bowlegs	4	1,345
Burden	3	345
Harjoche	6	715
Hilly	3	1,045
Jones	4	1,786
McGeisey	1	30
Melisse	1	400
Walker	4	735
Wise	12	4,060
Empire:		
Lacy	6	683
Wise	2	632
Gypsy:		
Bowlegs	1	0
Bradley	1	10
Cumsey	4	1,877
Dosar	1	100
Grayson	4	765
Harjoche	1	830
Henderson	1	210
Jones	1	345
Walker	8	2,359
Wise	3	377
Indian Territory:		
Barnett A	1	344
Barnett B	2	242
Billington	5	969
Bowlegs	11	1,601
Davis	4	1,318
Fay	9	2,803
Goforth	11	1,569
Livingston	11	4,083
Lizzie	2	611
Walker	8	1,065
Wilmont	4	967
Work	1	145
Youngblood	2	215
Magnolia:		
Davis, B. F.	1	682
Davis, M.	1	335
Hammond	2	104
Rhoades	2	5,413
Van Buskirk	1	315
McColloch:		
Bowlegs	3	370
Mid-Continent:		
Baker	4	1,798
Bowlegs	1	25
Hutke	1	1
Smith	6	755
Minnehoma:		
Bowlegs	3	260
Prairie:		
Gahagan	4	680
Harber	8	3,865
Jones	4	555
Templeton	4	3,189
Whitney	4	555
Pure:		
Reed	15	3,479
Strothers "D"	4	729
Strothers "F"	3	580
Roxana and Houston:		
Taylor	6	1,292
Shaffer:		
Lacy	3	565
Sinclair:		
Bowlegs	1	35
Cumsey	4	5,817
Ellen	6	1,684
Harjo	3	825
Jones	6	4,715
Taylor	4	3,189
Walker	4	1,844
The Texas Company:		
Reed	1	825
Tidal:		
Grayson	3	1,165
Harjoche	6	2,630
Twin State:		
Jones	2	5
Total Bowlegs	308	92,649
Earlsboro		
Amerada:		
Anderson	2	1,165
Cowden	8	2,085
Rodgers	3	1,835
Barnsdall:		
Brown	4	1,946
Bruner, F.	2	1,001
Bruner, N.	4	1,478
Cudjo, C.	1	27
Davis, D.	3	1,685
Davis, J.	4	817
Davis, M.	3	145
Gibson	8	2,097
Hearn	1	5
Ingram	7	5,893
Pack	4	191
Peter	4	461
Sango	3	7,041
Sebolka	1	799
Sullivan, H.	2	0
Sullivan, Harjo	2	30
Wasutke	4	1,259
Carter:		
Davis	2	40
Payne	3	175
Sango	40	3,005
Continental:		
Kays	2	405
Spencer	4	1,290
Crosbie:		
Bryant	2	60
Empire:		
Barker	1	1,722
Edmundson	3	1,207
Gypsy:		
Bruner	4	2,062
Carter	10	3,980
Earl	1	20
Hunick	1	2,265
Boro	1	12
Noble	4	4,105
Peter	3	225
Sango	5	4,907
State	4	1,257
Independent:		
Bruner	4	165
Sullivan	4	107
Knapp	5	2,440
Gaines	4	1,380
O'Dell	4	0
Inter-Ocean:		
Payne	1	0
Magnolia:		
Bryant	6	1,987
Cowden	4	56
Dixon	1	0
Edmundson	3	42
Holmsley	8	2,194
Ingram	1	30
Lena	3	83
Seay	9	5,602
Simpson	4	294
Sparks	7	2,837
Sullivan	3	129
Mid-Continent:		
McCumber	7	385
Mid-Kansas:		
Anderson	4	225
Phillips:		
Dunnaway	1	45
Graham	7	227
Prairie:		
Baker	1	50
Davis	4	6,735
Graham, C.	2	25
Graham, O.	4	1,660
Stidham	13	4,180
Roxana:		
Bayliss	1	14
Spencer	2	2,051
Shaffer:		
Clark	5	1,102
Sinclair:		
Foreman	1	15
Hollins	3	215
Sango	2	4,505
Skelly:		
Spencer	2	723
The Texas Company:		
Anderson	6	715
Brown	8	2,565
Rodgers	4	4,705
Wilmont	6	3,325
Tidal:		
Watkins	8	2,895
Twin State:		
Barker	3	135
Hearn	4	3,045
Total Earlsboro	289	113,585
Seminole		
Carter:		
B. Carter	2	200
J. Carter	3	12
F. Carter	3	33
Creasy	2	33
R. Cudjo	4	280
W. Cudjo	2	30
Gilliland	2	335
Grisso, M.	1	235
Grisso, W.	5	350
Jackson	1	10
Knapp	3	60
Killing, M.	12	7,542
Killing, G.	4	385
Lukes	7	1,550
Ponder	2	30
Simpson	3	75
Strother	4	440
Vierson	3	300
Amerada:		
Fixico	4	1,081
Killing	4	563
Rentie	3	556
Atlantic:		
Cudjo, N.	3	626
Barnsdall:		
Carter	8	2,145
Henry	3	574
Jones	4	910
Empire:		
Gross	2	40
Wilson	2	322
Gypsy:		
Butler	3	1,077
Carter	8	477
Cudjo	5	415
Fixico	7	135
Harjo	3	1,050
Wolf	6	270
Independent:		
Davis	3	965
P. Fixico	3	290
Harjo	3	70
Independent and Garland:		
T. Fixico	8	585
Independent and Inter Ocean:		
Jones	4	258
Indian Territory:		
Allen	2	452
Bowlegs	12	2,700
Gooden	4	326
Harjo	3	132
James	2	237
Reed	2	26
Kingwood:		
Johnson	3	1,247
Magnolia:		
Born	1	42
Franks	4	824
Mid-Continent:		
Rentie	9	1,245
Tayeche	7	320
Mid-Kansas:		
Wilkins	1	5
Phillips:		
Strothers	2	140
Prairie:		
Gross	5	125
Mason	1	80
Spencer	1	12
Strother	8	1,325
Pure:		
Strother "A"	17	5,344
Strother "B"	5	1,987
Stro.her "C"	1	250
Roxana:		
Harber	2	297
Lashley	2	27
Sinclair:		
Carter	2	27
Cudjo, A.	6	1,050
Cudjo, B.	4	1,150
Dicey	2	1,595
Fixico	4	890
Slick:		
Cudjo	3	760
Franks	8	1,404
Giblet, Sam	3	2,170
Tiger	1	91
Superior:		
Cudjo	4	656
The Texas Company:		
Mayhue	1	315
Strothers	2	130
Tidal:		
Carter	4	758
Fixico	6	748
Harjo, D.	3	735
Harjo, T.	6	180
Mahardy	2	142
Turman:		
Cudjo	4	1,314
Grisso	1	431
Jones	4	1,045
Total	314	57,093
Searight		
Carter:		
Davis	7	750
Frazier	6	2,895
Johnson	1	5
Kiker	1	30
Mandler	2	30
Scott	1	20
Amerada:		
Johnson	1	75
Strother	2	1,412
Gypsy:		
Cudjo	4	707
Mid-Continent:		
Grayson	6	50
Soloche	4	2,080
Pine:		
Lulla	1	60
Prairie:		
Cannon	1	5
Carter	1	20
Houck	1	5
Kincaid	5	80
Wiemer	1	20
Superior:		
Varnum	1	62
Pure:		
Aldridge	6	2,593
Roxana:		
Strother	4	2,650
Sinclair:		
Polly	4	1,825
The Texas Company:		
Fleet	1	60
Twin State:		
Varnum	2	450
Wilcox:		
Chupco	8	3,116
Total	71	18,994
Total Little River	97	34,514
Total Bowlegs	308	92,649
Total Earlsboro	289	113,585
Total Seminole	314	57,093
Total Searight	71	18,994
Total Maud	2	0
Grand total	1,081	316,835

CALIFORNIA GASOLINE PRICES CONTINUE SOFT

LOS ANGELES, Calif., Feb. 17.—The California oil market at the present time is rather soft. Quantities of fuel oil are going to storage and prices are weak. Due to a cold spell there has been heavy demand for so-called smudge oil during the past few days. This is not expected to last as it is unusual to have to do much smudging this late in the year.

The gasoline market remains about the same. Marketers of gasoline are anxiously waiting to see what steps the major companies will take when the present 6-cent contracts now in effect from a few of the larger companies run out. It is the consensus of opinion that such a large margin will not be given during the coming year and many are looking for a reduction in the retail price with a corresponding reduction in the spread between tank wagon and service station prices. If the market strengthens sufficiently by that time, some believe that there will be no retail price change. Almost all agree that there will be some developments announced by the major companies before March 20 and all are anxiously awaiting to see just what will be done.

Natural gasoline continues weak. Spot sales have been made as low as 6½ cents per gallon but no appreciable quantities are moving at this low figure. Purchasers who are endeavoring to contract natural gasoline or who are buying large quantities of this product find that they are unable to obtain it much below 7½ cents. There is no improvement in sight at the present time for this market.

J. J. M'GRAW CHOSEN SINCLAIR DIRECTOR

NEW YORK, Feb. 18.—J. J. McGraw president of the Exchange National Bank of Tulsa, and for many years promi

J. J. McGraw

nently identified with the producing branch of the petroleum industry, has been elected a director of the Sinclair Consolidated Oil Corp.

CALIFORNIA RECEIPTS AND PETROLEUM IMPORTS

Imports of crude and refined oils at the principal United States ports for the week ended February 11 totaled 1,237,000 bbls., a daily average of 176,714 bbls. compared with 1,903,000 bbls., a daily average of 271,857 bbls. for the week ended February 4, and a daily average of 220,250 bbls. for the four weeks ended February 11.

At Atlantic Coast Ports—	
Baltimore	....
Boston	....
New York	744,000
Philadelphia	196,000
Others	81,000
Total	1,027,000
Daily average	146,714
At Gulf Coast Ports—	
Galveston district	47,000
New Orleans and Baton Rouge	40,000
Port Arthur and Sabine district	123,000
Tampa	....
Daily average	30,000
At All United States Ports—	
Total	1,237,000
Daily average	176,714
Daily average four weeks ended	220,250

Receipts of crude and refined oils at Atlantic and Gulf Coast ports for the week ended February 11 totaled 561,000 bbls., a daily average of 80,143 bbls. against 110,000 bbls., a daily average of 15,714 bbls. for the week ended February 4 and a daily average of 68,000 bbls. for the four weeks ended February 11.

At Atlantic Coast Ports—	
Baltimore	....
Boston	....
New York	96,000
Philadelphia	371,000
Others	96,000
Total	561,000
Daily average	80,143
At Gulf Coast Ports	....
Daily average	....
Total Atlantic and Gulf Coast Ports	561,000
Daily average	80,143
Daily average four weeks ended	68,000
Distribution of total California receipts is as follows:	
Crude	152,000
Gasoline	256,000
Kerosene	96,000
Lubricating oil	58,000
Total	561,000

ALEXANDER M'DOUGALL DEAD

CHATHAM, Ontario, Feb. 18.—Alexander McDougall, at one time a prominent Canadian driller, died recently at Sarnia, Ontario, aged 53. A native of the Petrolia Field, Mr. McDougall spent his early years in oil production in Canada and later drilled for three years in Persia and one in Burma. A wife and two sons survive.

Announcing

FLUID-FUSION

Trade Name
of the Electric Welding Process
developed and used by

P. I. W.

in the manufacture of

Pressure and Temperature Vessels
and
Corrosion Resisting Equipment
in
Chrome Iron or Stainless Steel

P.I.W. Products

WELDED VESSELS
STILLS
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OIL REFINERY EQUIPMENT
"PENNSYLVANIA" TANK CARS
SMOKE STACKS
STAND PIPES
WELDED PRESSURE PIPE
STEEL BARRELS
GENERAL STEEL PLATE CONSTRUCTION

The FLUID-FUSION Process

The P.I.W. "FLUID-FUSION" process is automatic and produces an exactly uniform and homogeneous weld in which the variable human element is entirely eliminated. The process is such that the molten weld metal being deposited is prevented from absorbing oxygen and nitrogen from the air. Tension and torsion tests conducted on regular production are guaranteed to exceed the strength of the plate itself, with the tensile strength curve declining gradually from its peak in the weld to the rated plate strength at points several inches distant on each side of the weld. Size and contour of vessels manufactured with this process have been limited only by transportation restrictions. So far no commercial use has been found for the ultimate wall thickness guaranteed by P.I.W. for the "FLUID-FUSION" weld.

Write for further particulars and details of tests. P.I.W. engineers will gladly study your problem.

The Petroleum Iron Works Co.
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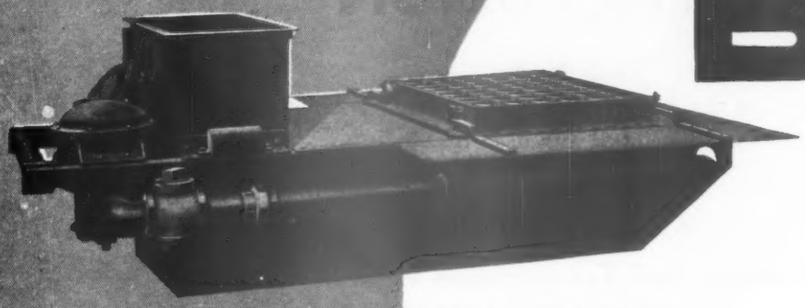
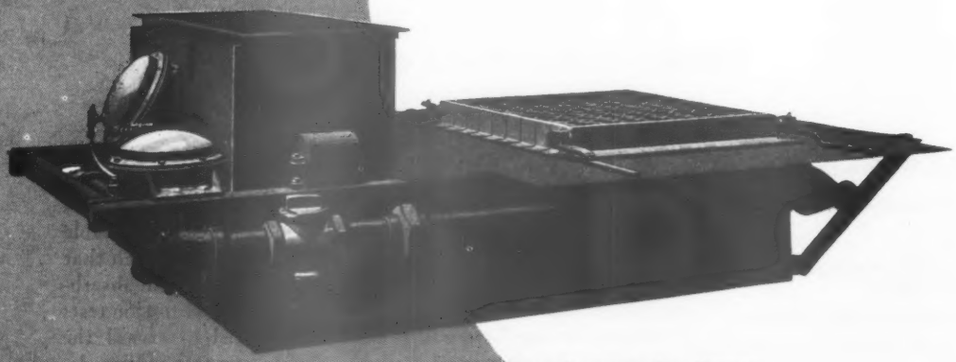
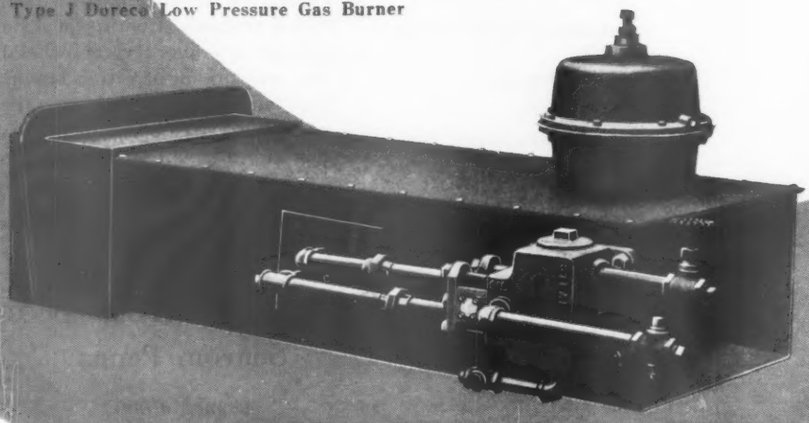


Type B Dureco Low Pressure Gas Burner



Type J Dureco Low Pressure Gas Burner



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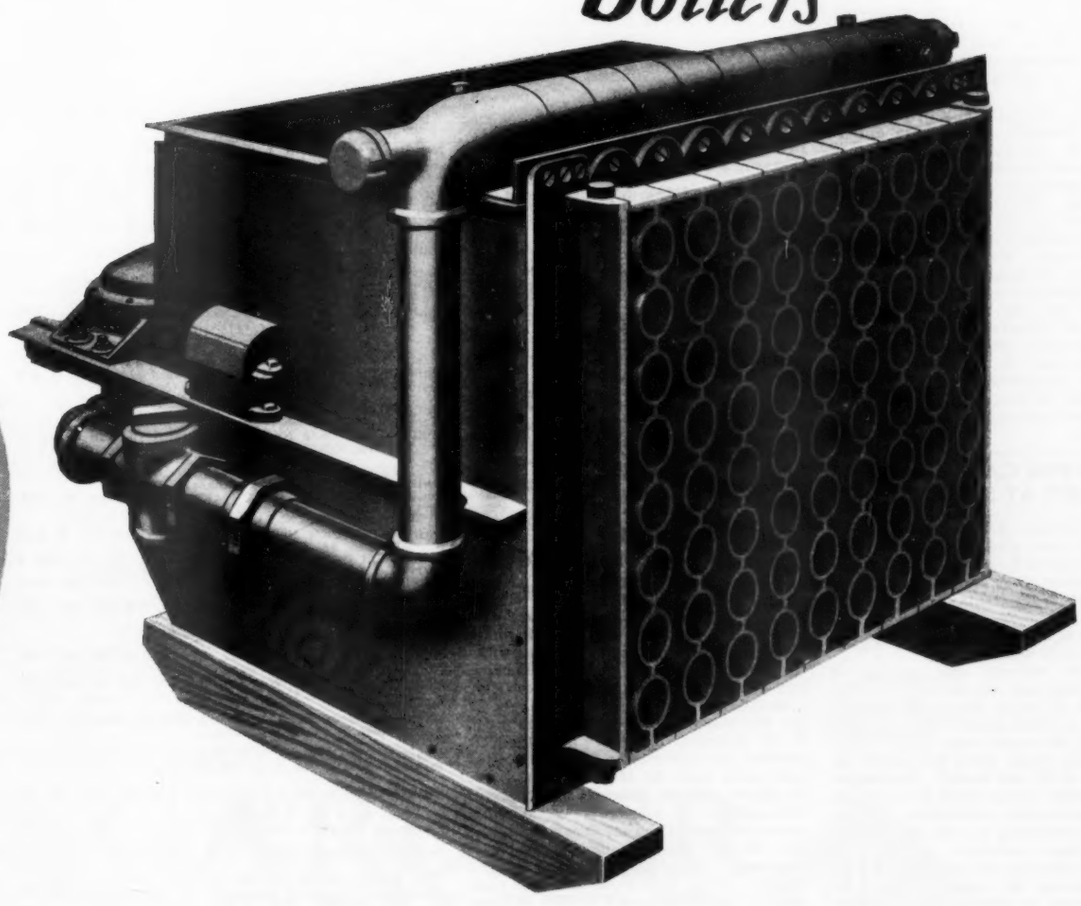
Type "P" for Return Tubular Boilers



SUPPLY COMPANIES

J. H. Greer, Known in Many Oil Fields, Dies of Peritonitis

J. H. Greer, general superintendent of production for the Pure Oil Co., died in Tulsa on Friday, February 17, of peritonitis following appendicitis.

Mr. Greer was one of the best known oil men in the Mid-Continent Field. He was born 51 years ago in Duke Centre, Pa., and was educated in the public schools of that town and Bradford, Pa. He entered the oil business over 30 years ago.

Mr. Greer worked for the old Pure Oil Co. in Pennsylvania and later in the old Central West fields. He left the service of that company in Casey, Ill., and became a dealer in leases. He came to Oklahoma in 1913 and entered the employment of the National Supply Co. at Cleveland. Later he was with The Texas Company, the A. E. Humphreys interests and the Pure Oil Co. when that company bought out the Humphreys company. The Pure Oil Co. made Mr. Greer district superintendent in the Arkansas Field. Last year he came to Tulsa as general superintendent of all the company's western operations.

Deceased is survived by his wife and son Robert, age 14 years, and two sisters.

PENNSYLVANIA MARKET MOVEMENT IS SLOWER

OIL CITY, Pa., Feb. 20.—The market for Pennsylvania products is a little slower than it was a week ago. Gasoline movement at most of the refineries has slowed up considerably. One of the largest refineries in the State is quoting motor fuels from three-eighths to one-half cent beneath the prices which the other refiners are asking.

Kerosene is also generally weak in this territory. However, refiners are anticipating a big demand for this product soon as the peak season, when the tractors are again placed in use, is only a few weeks away. Fuel oil is still good. Neutrals are in good demand. Cylinder stocks and bright stocks are unchanged from a week ago. Wax is stronger.

The motor oil demand from the Pennsylvania refineries is starting off this year slower than last year. This is due to the reluctance of brokers and marketers to place orders when there is no indication of any increases in the crude market. However, it is expected that the marketers will soon be forced into the market for good sized quantities by the needs for consumption.

U. S. MOTOR GASOLINE STRONGER AT SHREVEPORT

SHREVEPORT, La., Feb. 20.—Showing a little more strength, U. S. Motor fuel in Arkansas-Louisiana territory is quoted by Shreveport and El Dorado refiners at 6⅜ to 6½ cents over the week-end.

Kerosene is firm throughout the territory at 4¾ to 5 cents.

Shreveport refiners are quoting 3 cents on dark gas oil and 3⅛ to 3¼ straw color at which prices the product is moving a little better than a week ago due to the recent cold snap. Fuel oil is moving freely from Shreveport at 97½ cents to $1 per barrel. Unchanged from last week, though there is said to be a willingness to take concessions of varying degree according to the size of the order on large contracts.

Scattered inquiries on gas oil have been received during the week and one El Dorado refiner is bidding for a 30,000-bbl. contract of zero cold test 30-32 straw color for export at a small concession.

DEATH OF WALTER S. HOYT

Walter S. Hoyt, president of the Hoyt Oil Co., died at his home in Kansas City, Mo., after an illness of more than a year. Death followed an acute heart attack. Mr. Hoyt, at one time an extensive operator in the natural gas field, went to Wichita, Kans., in 1908, as representative of the Barnsdall interests, and became active in independent development projects in the Augusta, Kans., Field, later vice president and treasurer of the Wichita Natural Gas Co., which was sold to the Doheny interests. He then acquired interests in Texas in addition to expanding his Kansas holdings. His most recent operations were in the Leon Field in Butler County, Kansas. He also had royalty rights in the Ranger, Tex., area. Mr. Hoyt was born at Millerstown, Pa., 49 years ago.

LOUISIANA-ARKANSAS OIL IN STORAGE UP

SHREVEPORT, La., Feb. 18.—An increase of 5,091,460 bbls. in the amount of oil in storage in the several north Louisiana and Arkansas pools shows the effect the effort to move Oklahoma and Texas light oils is having on these pools, notwithstanding refiners here and in El Dorado were prepared to run more crude to their stills. Storage as of January 1 totaled 22,970,262 bbls., while the report as of February 1 shows a total of 28,061,722 bbls., most of the increase being in heavy oils. Stocks of Smackover crude account for 5,219,227 bbls. of the increase.

While most of the increase is in Smackover not all of the oil in the tanks is heavy for while stocks of El Dorado, Caddo and DeSoto light oils are smaller, due partly to natural decline of the wells and partly to withdrawals, Homer, Haynesville, Cotton Valley and Red River, all light oil districts, show increased stocks. There were 262,147 bbls. less oil in storage February 1, in El Dorado than on January 1; 55,006 less in Caddo and 60,350 in DeSoto. Red River's slight increase of 1,116 appears more a day-to-day fluctuation than any real change in the situation. Smackover stocks gained 5,219,227 bbls.; Nevada County, 20,656; Cotton Valley, 15,672; Homer 241,747; Haynesville, 143,692; Bellevue (heavy), 25,683, and Urania (heavy), 8,020 bbls.

Oil in Storage in North Louisiana and Arkansas Fields, February 1, 1928

	Steel	Earthen
North Louisiana		
Caddo	2,064,762	710,732
Cotton Valley	309,776	294,104
Homer	3,201,536	.....
Haynesville	4,518,124	.....
DeSoto	945,184	.....
Red River	35,274	.....
Bellevue	203,531	.....
Urania	78,211	.....
Total steel storage	11,356,398	1,004,836
Total storage	12,361,234	
Arkansas		
El Dorado and Lisbon	1,838,519	.....
Smackover	7,069,347	6,500,296
Nevada County	138,609	163,717
Total steel storage	9,046,475	6,664,013
Total storage	15,710,488	
Steel storage, both states	20,402,873	7,668,849
Total storage	28,071,722	

DEPARTMENT HEADS OF MAGNOLIA MEET

SHREVEPORT, La., Feb. 18.—Eighty department heads of the Magnolia Petroleum Co. and its subsidiaries, Magnolia Pipe Line Co. and Magnolia Gas Co., in the several districts of the North Louisiana and Arkansas oil and gas country, attended the annual division banquet at the Washington Hotel here February 16. E. D Holcomb, division superintendent, presided as toastmaster. The principal talks were made by Mr. Holcomb, F. V. Faulkner, general manager, and M. J. McLaughlin, his assistant; W. M. Ray, superintendent of the gas department, and Mr. Dorsey, head of the geological department, all of Dallas, and Yandell Boatner, of the legal department and president of the Shreveport Chamber of Commerce. Music for the evening was furnished by the "Magnolia Blossoms," a seven-piece orchestra recruited from the truck department and said to be one of the best in this part of the country.

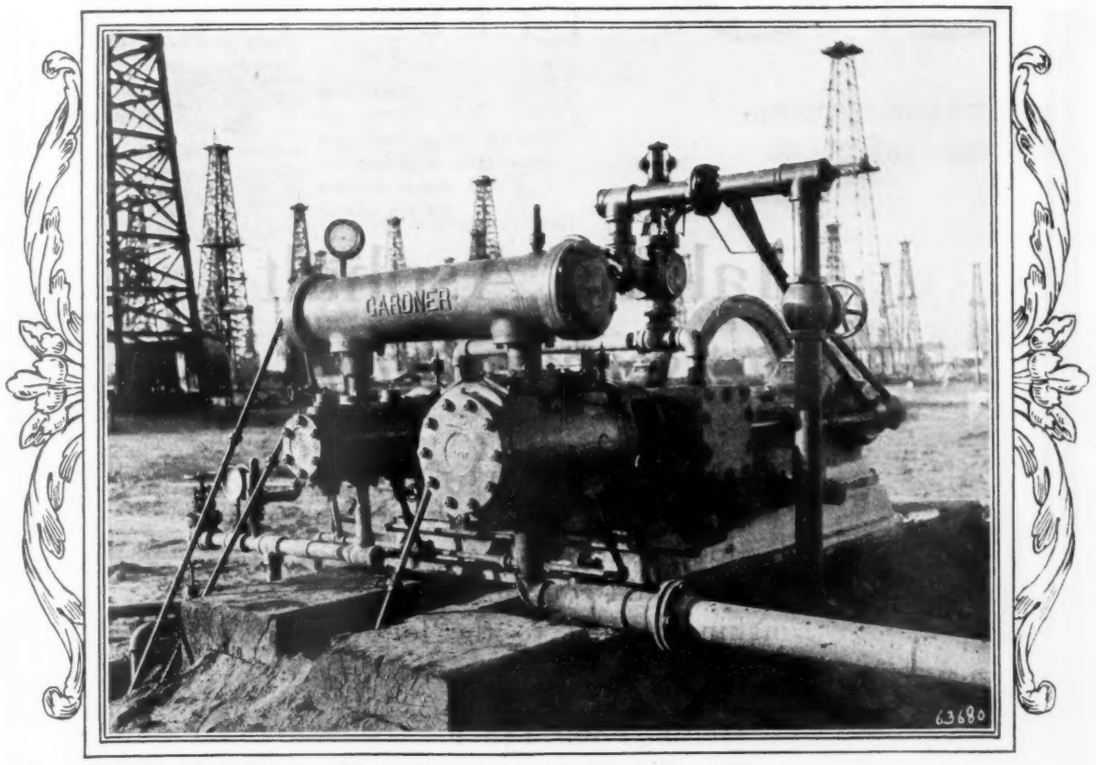
L. H. FRANTZ DIES

Lewis H. Frantz, Jr., secretary and treasurer of the LubriKup Co., Williamsport, Pa., died recently at his home in Williamsport.

WILDCAT OPERATIONS IN PANHANDLE

(Continued from Page 38)

Danciger O. & R. Co.'s No. 1 A. Chapman, SW cor. NW, Sec 7, Blk. 26, H. & G. N. Sur.	Run. 8¼-in. csg., 1,350 ft.
Danciger O. & R. Co.'s No. 1 C. W. Bradford, NE cor. SE, Sec. 123, Blk. B-2, H. & G. N. Sur.	Drlg., 1,810 ft.
Danciger Oil Co.'s No. 1 J. S. Morse, SE cor. NE SW, Sec. 2, Blk. 26, H. & G. N.	Rig on ground.
Donley Gray Oil Co.'s No. 1 J. W. Gordon, Sec. 79, Blk. 3	Wtr., 3,380 ft. and 3,420 ft; show oil; H.F.W., 3,650 ft; T.D., 3,870 ft; U.R. 6-in. csg., 3,852 ft.
Delaney et al's No. 3 W. Jackson, SE cor. NE SW, Sec. 88, Blk. B-2	Drlg., 2,230 ft.
Delaney et al's No. 6 Jackson, SW cor. E half, SW Sec. 88, Blk. B-2, H. & G. N. Sur.	Drlg., 1,800 ft.
Edwards et al's No. 1 E. J. Case, NE cor. Sec. 132, Blk. B-2, H. & G. N. Sur.	70,000,000 ft. gas, 2,512-2,630 ft; drlg. by bit, 2,028 ft; 1,000 ft. oil in hole; drlg. by whipstock.
Empire G. & F. Co.'s No. 1 A. Barrett, C SW, Sec. 132, Blk. 3, I. & G. N. Sur.	Drlg., 1,825 ft.
Empire G. & F. Co.'s No. 1 E. J. Case, C NE, Sec. 180, Blk. B-2, H. & G. N. Sur.	Drlg., 1,700 ft.
Empire G. & F. Co.'s No. 1 S. A. Cobb, NW cor. NE, Sec. 64, Blk. 25, H. & G. N. Sur.	Drlg., 1,300 ft.
Empire G. & F. Co.'s No. 1 C. A. Bell, C SE, Sec. 134, Blk. 3, I. & G. N. Sur.	Drlg., 1,750 ft.
Empire G. & F. Co.'s No. 1 Bender, SE cor. Sec. 164, Blk. 3, I. & G. N. Sur.	Top lime, 2,507 ft; drlg.
Empire G. & F. Co.'s No. 1 A. J. Dauer, NW SE SE, Sec. 236, Blk. B-2, H. & G. N. Sur.	Building rig.
Eslick et al's No. 1 Mrs. J. A. Hopkins, NW cor. W 80 acres of SW ¼, Sur. 84, H. & T. C., Blk. B-2	Spudded.
Gibson Oil Corp.'s No. 3 J. B. Bowers, 1,650 ft. from E line and 990 feet from S line, E half, Sec. 92, Blk. B-2	Drlg., 2,395 ft.
Gibson Oil Corp.'s No. 9 J. B. Bowers, NE cor. Sec. 92, Blk. B-2, H. & G. W. Sur.	Drlg., 250 ft.
Gulf Prod. Co.'s No. 4 J. B. Bowers, SE SW SW, Gulf lease in Sec. 89, Blk. B-2	Drlg. sand, 830 ft.
Gulf Prod. Co.'s No. 5 J. B. Bowers, SW SE SW, Gulf lease in Sec. 89, Blk. B-2	Set 15½-in., 528 ft; drlg. gyp, 1,775 ft.
Gulf's No. 2 Holmes, SE cor. NE, Sect. 107, Blk. 3, I. & G. N. Sur.	Drlg. lime, 2880 ft., 25,000,000 ft. gas, 2,870-80 ft; set 6-in. csg., 2,909 ft. to shut off gas; T.D., 2,940 ft.
Gulf Prod. Co.'s No. 1 M. Davidson-A, 330 ft. from S. and E lines of NW cor. E half NW, Sec. 87, Blk. B-2, H. & G. N. Sur.	Drlg. lime, 2,025 ft.
Gurnsey Oil Co.'s No. 2 B. E. McKinney, Sec. 163, Blk. 3, I. & G. N. Sur.	Show oil, 3,025-30 ft; fish., 3,084 ft.
Hardendorf Drlg. Co.'s No. 1 G. A. Henderson, NE E half NE, Sec. 47, Blk. 25, H. & G. N. Sur.	Run. 10-in. csg., 590 ft.
McAuley et al's No. 1 Morse, SE cor. N half, Sec. 3, Blk. 26, H. & G. N. Sur.	Drlg., 550 ft.
Majestic Oil Co.'s No. 4 J. B. Bowers, SW cor. E half, Sec. 92, Blk B-2	Drlg., 1,275 ft.
Magnolia Pet. Co.'s No. 1 J. Bowers	Made 400 bbls. daily from G.W., 2,853-55 ft; T.D., 2,875 ft; to D.D.
Magnolia Pet. Co.'s No. 1 J. J. Wall, NE cor. Sec. 162, Blk. 3, I. & G. N. Sur.	Drlg. lime, 3,220 ft; S.O.&S.G., 3,190-3,202 ft.
McMan Oil & Gas Co.'s No. 1 Osborne, NE cor. W half SE, Sec. 86, Blk. 3, I. & G. N. Sur.	Rigging up.
Midwest Expltn. Co.'s No. 1 L. Holmes, Sec. 86, Blk. 3, I. & G. N. Sur.	Show 43 grav. oil in G.W., 3,110-12 ft; cmt. 8-in., 3,015 ft.
Neudigate et al's No. 1 A. Chapman, NE cor. E ½, SE, Sec. 52, Blk. 25	500,000 ft. gas, 2,760-65 ft; rainbow of oil, 2,820-25 ft; salt wtr; G.W., 2,827-28 ft; set 6-in 2,889 ft; rainbow show; U.R. 6-in. csg. 2,970 ft.
Operators Oil Co.'s No. 2 W. Jackson, NW cor. N ½ NE, Sec. 88, Blk. B-2	Drlg., 1,680 ft.
Phillips Pet. Co.'s No. 1 J. B. Bowers, NW cor. E half, NE, Sec. 47, Blk. B-25, H. & G. N. Sur.	Cellar.
Phillips Pet. Co.'s No. 1 Davidson (Myson)	Drlg., 2,500 ft.
Phillips Pet. Co.'s No. 2 Davidson (Myson), NE cor. NW NW, Sec. 87, Blk. B-2, H. & G. N. Sur.	Spudding.
Phillips Pet. Co.'s No. 1 W. Jackson (was Clark et al's No. 2)	S.O., 2,890 ft; swb. 240 bbls., daily, 2,905-39 ft; drlg., 3,018 ft; show wtr; wtr. exhausted; drlg. hard G.W., 3,021 ft.
Phillips Pet. Co.'s No. 2 W. Jackson (was Clark et al's No. 3)	T.D., 2,994 ft; swabbing, 60 bbls. daily; to D.D; off prodn.
Phillips Pet. Co.'s No. 3 W. Jackson	Show gas, 2,572-2,600 ft; cmt. 8-in. csg., 2,834 ft.
Phillips Pet. Co.'s No. 1 Jackson-Riley (was Clark et al's No. 1 W. Jackson)	7,000,000 ft. gas, 2,442-2,545 ft; swbd. 160 bbls., 2,981 ft; S.D., 3,010 ft.
Phillips Pet. Co.'s No. 2 Jackson-Riley	Fish., 2,705 ft.
Phillips Pet. Co.'s No. 3 Jackson Riley, Sec. 88, Blk. B-2, H. & G. N. Sur.	Recmntd. 12½-in., 1,027 ft; drlg., 2,325 ft.
Phillips Pet. Co.'s No. 4 Jackson-Riley, SE cor. W half SW, Sec. 88, Blk. B-2	Spudding.
Pampa Oil Co.'s No. 1 W. R. Campbell, Sec. 90, Blk. 3	700 ft. wtr., 3,420 ft; S.D., 3,423 ft.
Purple Sage Oil Co.'s No. 2 E. B. Johnson	S.D., 1,980 ft.
Ray & Massie's No. 1 A. Chapman, NE NW SW, Sec. 51, Blk. 25	Drlg., 2,370 ft.
Renaud Pet. Co.'s No. 2 M. Huseiby, NE cor. SW, Sec. 55, Blk. 25, H. & G. N. Sur.	Drlg., 1,400 ft.
Remo Oil Co.'s No. 1 B. E. McKinney	Rigged up and S.D.
St. Clair Oil Co.'s No. 1 C. H. Rowe	Spud. and S.D.
St. Clair Oil Co.'s No. 1 L. S. Stocklon, SE cor. Sec. 35, W. R. Lee Sur.	Spudded and S.D.
Shamrock Oil Co.'s No. 1 Chapman, NE E half SW, Sec. 50, Blk. 25	5,000,000 ft. gas, 2,660-70 ft; T.D., 2,680 ft; cmt. 6-in. csg., 2,655 ft.
Skelly Oil Co.'s No. 1 Bradford, NE cor. Sec. 118, Blk. B-2, H. & G. N. Sur.	12,000,000 ft. gas, 2,765 ft; drlg., 2,780 ft.
Spartan Oil Co.'s No. 1 J. Hopkins	Rig.
Sullivan et al's No. 1 A. Chapman-A	S.D., 2,320 ft; 23,000,000 ft. gas, 2,280-2,300 ft.
Sullivan et al's No. 1 S. A. Cobb, NE cor. NW, Sec. 64, Blk. 25, H. & G. N. Sur.	Location.
Sun Oil Co.'s No. 1 Jackson	Top lime, 2,035 ft; drlg., 2,950 ft.
Staggers Oil Co.'s (was Ruby Oil Co.'s) No. 1 B. F. Tally	T.D., 635 ft; S.D.
The Texas Company's No. 2 J. B. Bowers	Show gas, 2,810 ft; show oil, 2,820 ft; drlg. G.W., 3,025 ft.
The Texas Company's No. 3 J. B. Bowers	Fish., 2,765 ft; 44,000,000 ft. gas.
The Texas Company's No. 4 J. B. Bowers, SE cor. SE, Sec. 93, Blk. B-2	Drlg., 1,800 ft.
The Texas Company's No. 2 H. M. Davis, SW cor. NW, Sec. 86, Blk. 3	Set 8⅝-in., 2,150 ft; drlg., 2,850 ft.
The Texas Co.'s No. 1 M. B. Davis, SE cor. NE, Sec. 8, Blk. 1, A. C. H. & B.	Rig.
The Texas Company's No. 1 McLarty et al, SW cor. E ½ NW, Sec. 1, Blk. 1, A. C. H. & B. Sur.	Drlg., 1,740 ft.
The Texas Company's No. 1 S. McLarty	T.L., 1,712 ft; drlg., 1,810 ft.
The Texas Company's No. 1 W. H. Taylor, C NE, Sec. 10, Blk. B-2 (formerly Smallwood et al's)	Drlg., 835 ft.
The Texas Co.'s No. 1 C. Thut, C N half of E 320 A. Sec. 1, H. & G. N. Sur.	Drlg., 2,240 ft.
The Texas Co.'s No. 1 M. B. Davis, SE cor. NE, Sec. 8, Blk. 1, A. C. H. & B. Sur.	Location.
The Texas Co.'s No. 2-A Chapman, NE cor. NW NW, Sec. 51, Blk. 25, H. & G. N. Sur.	Drlg., 835 ft.
The Texas Co.'s No. 1 J. E. Williams, NW cor. NE NW, Sec. 7, Blk. 1, A. C. H. & B. Sur.	Rig on ground.
Viola Oil Corp.'s No. 1 G. H. Saunders	Spudded and S.D.



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HALE COUNTY

Bailey & Young's No. 1 Thomas, Sec. 1, Blk. J.K.L.—S.D., 175 ft.
Donnell Pet. Co.'s No. 2 Mullican, NW cor. Sec. 66, Blk. A-3, I. & S. B. Sur.—Top pay in sandy shale, 405 ft., ⅛ baller oil and 3 ballers wtr. per day; S.D., 620 ft.
Donnell Pet. Co.'s No. 1 Mullican, C Sec. 21, Blk. B, R. M. Thompson Sur.—200 ft. fluid in hole from 407-14 ft; S.D.
Expltn. Co.'s No. 1 Crawford, C NE, Sec. 17, Blk. C-3, T. T. R. R. Sur.—Spudded and S.D.
Expltn. Co.'s No. 1 Goodman—S.D., 350 ft.
A. S. Mimm's No. 1 W. A. Ritcher, 700 ft. from east line and 1,200 feet from south line, Sec. 17, Blk. X, John Glynn Sur.—S.D., 1,140 ft.
Tolbert & Simms' (was Gouldy & Stone's) No. 1 Kitteral, SE cor. NW, Sec. 65, Blk. A-3, G. C. & S. F. Sur.—S.D., 485 ft.

HALL COUNTY

Briscoe Oil Assn's (was Seifert et al's) No. 1 Owens, C NE, Sec. 179, Blk. S-5, Dennison & Pacific Sur.—Spudded and S.D.

HANSFORD COUNTY

Caldwell et al's No. 1 J. Adriance est.—S.D., 1,003 ft.
Oklavania et al's No. 1 Coots, Sec. 13, Blk. 46, H. & T. C. Sur.—Cmt. 10-in. csg., 990 ft; S.D.

HOCKLEY COUNTY

World Oil Co.'s No. 1 Ellwood—S.D., 1,455 ft. to install rotary.

HARTLEY COUNTY

Deep Rock Oil Co.'s No. 1 Lymann & Balfour, Sec. 9—Preparing to abd., 4,038 ft.

HEMPHILL COUNTY

Hoover et al's No. 1 Schaller est., Sec. 4—Spudded and S.D.
Hoover et al's No. 1 fee, J. S. Hood Sur.—300 ft. wtr. in hole; drlg., 5,005 ft

HUTCHINSON COUNTY

R. G. Barnum et al's No. 1 Garland Sanford, Sec. 78, Blk. 46—Rig.
Beam et al's No. 1 Cockrell, Sec. 3, Blk. 23—S.D., 405 ft. for orders.
Big Coach Oil Co.'s No. 1 Dunnaway, Sec. 5, Blk. Y—S.D., 750 ft.
Conklin et al's No. 1 Johnson, Sec. 1, Blk. X03, H. & O. B. Sur.—S.D., 600 ft.
Dixon Creek Oil Co.'s No. 1 Burnett est., NW cor. of E 240 A of N 320 A, Sec. 120, Blk. 5, I. & G. N. Sur.—Run. 15-in., 450 ft; drlg., 670 ft
Harris et al's No. 1 J. Q. Bost, Sec. 10, Blk. Y-2, T. T. R. R. Sur.—Drlg., 1,421 ft.
Holmes & Quinn's No. 1 J. K. Quinn, SW cor. Sec. 9, Blk. 3, B. S. & F. Sur.—Drlg., 530 ft.
McMan O. & G. Co.'s No. 1 Albert Yake, SW cor. SE, Sec. 2, Blk. J, H. & G. N. Sur.—Set 8¼-in. pipe, 2,107 ft. Show gas 2,220 ft; 10,000,000 ft. gas; drlg. 2,885 ft.
Phillips Pet. Co.'s No. 12 Elva-Whittenburg, E. Tomlinson Sur.—T.A., 4,445 ft.
Phillips Pet. Co.'s No. 1 Perkins-Hamilton, SW cor. of N 240 acres of S half, Sec. 22, Blk. 47, H. & T. C. Sur.—Location.
Skelly Oil Co.'s No. 2 Armstrong & Byrd—Drlg., 1,090 ft.
Skyrocket Oil Co.'s No. 1 Mrs. R. A. Jameson—800 ft. oil in hole from 3,146 ft.; drilled to 3,180 ft; shot with 60 qts., 3,125-60 ft; bridged; no increase in oil after deepening; pumped 25 bbls. in 5 hrs; S.D.
The Texas Co.'s No. 1 Cockrell-B, Sec. 3, Blk. B-3—T.P., 3,015 ft; 500 ft. oil in hole; run liner, 3,040 ft; S.D., 3,121 ft.
Wendell et al's No. 1 Johnson Bros.—Drlg., 1,010 ft.

KING COUNTY

Humble O. & R. Co.'s No. 1 Pitchfork, Sec. 171, Blk. A-96, John H. Gibson Sur.—Hole full wtr., 3,375 ft; U.R. 8-in. csg., 3,435 ft; drlg., 3,632 ft
J. L. Pattison's No. 1 Patton—Slight show gas, 2,115-30 ft; fish 3,410 ft.

LAMB COUNTY

Dan Freel et al's No. 1 Ellwood, CWL Sec. 9, Blk. T, T. A. Thompson Sur.—Spudded and S.D.
Spade Oil Co.'s No. 1 Andrews, 1,085 ft. from N line and 200 ft. from E line, Labor 22, League 643, (5 miles NE of Littlefield)—Spud and S.D.
Tolbert & Simms' No. 1 Ellwood, NE SW SW, Sec. 14, Blk. B, R. M. Thompson Sur.—712 ft; small show oil and hole full wtr.; dry. 1,504 ft; temp abd.

LIPSCOMB COUNTY

Cal-Tex's No. 1 Bradford, C NE NE, Sec. 899, Blk. 43, H. & T. C. Sur.—Spudded and S.D.
Camp Creek Oil Co.'s No. 1 Mrs. H. D. May, Sec. 612, Blk. 43—S.D., 2,000 ft.
McCorkle's No. 1 A. Barton, NE cor. SW SE, Sec. 504, Blk. 43, H. & T. C. Sur.—Wtr. in lime, 4,126-40 ft; 6-in. set, 4,155 ft; 5 3/16-in. csg. set, 4,420 ft; S.D., 4,705 ft.
Ozark Drlg. Co.'s No. 1 Frass, NE SE, Sec. 106, Blk. 10, H. & T. C. Sur.—Rig on ground.
Smith, Kinsley & Ruby's No. 1 C. W. Jones, NE cor. SW, Sec. 100, Blk. 43—Show oil, 3,520 ft; S.W., 3,900 ft. U.R. 6-in. csg., 4,380 ft.

LUBBOCK COUNTY

Center Oil Co.'s No. 1 Bowles ranch—Small show oil, 1,133-40 ft., in sand; S.D., 2,730 ft.

MOORE COUNTY

Amarillo Oil Co.'s No. 1 Thompson-Amarillo, C. Sec. 22, Blk. 26, E. L. & R. R. Sur.—Set 24-in., 120 ft; drlg., 440 ft
Prairie and Shamrock's No. 2 Gober, Sec. 16, Blk. M-21—T.D., 2,520 ft; cmntd. 10-in. csg. 2,636 ft.

MOTLEY COUNTY

Explrn. Co.'s No. 1 Burleson—Spudded and S.D.
Explrn. Co.'s No. 1 Tillson—S.D., 750 ft. for repairs
Explrn. Co.'s No. 1 Matador Land & Cattle Co., C SW, Sec. 37, John Gibson Sur.—S.D., 1,002 ft.
Wheeler et al's No. 1 C. D. Bird, C NE, Sec. 4, Blk. S, Stephens Sur.—Spudded and S.D.

OLDHAM COUNTY

Prairie O. & G. Co.'s No. 1 Landegrin, SE cor. NE SW, Sec. 46, League 310, Capital land—1,900 ft. wtr., 4,085-93 ft; 1 baller wtr. per hr. and light scum oil 4,527 ft. (steel line meas.) cmt 6-in., 4,442 ft; 2,000 ft. S.W., 4,850-56 ft; T.D., 5,645 ft; plugging back to shoot.

OCHILTREE COUNTY

W. G. Burton's No. 1 Strickler—Fish. tools, 3,940 ft.
Hamilton et al's H. E. Wamble—S.D., 250 ft.
McCorkle P. L. Co.'s No. 1 R. H. Moore—S.D., 1,600 ft.
Montgomery's No. 1 Weinett—S.D., 850 ft.
Standard Development Co.'s No. 1 Bowen—S.D., 900 ft.

POTTER COUNTY

Amarillo Oil Co.'s No. 1 Masterson-K, C SW, Sec. 35, Blk. O-18, D. & P. R. R. Sur.—Recmtng. 12½-in. csg., 1,000 ft
Amarillo Oil Co.'s No. 1 Fuqua, C NW, Sec. 18, Blk. 6, B. S. & F. Sur.—Spudding.
Frank Allen et al's No. 1 W. H. Bush—S.D., 410 ft; corrected T.D

RANDALL COUNTY

Westbrook Oil Co.'s No. 1 J. Beckman, SW cor. SE NE, Sec. 46, Blk. B-5—S.D., 2,720 ft.

ROBERTS COUNTY

Big Bend Oil Co.'s No. 1 Mrs. H. Ledrick & Sons, Sec. 7, Blk. 5-A—Show gas, 4,990 ft; show oil, 4,992 ft; csg. set, 4,992 ft; T.D., 5,153 ft; U.R. for 2-in; did not shut off wtr; to reset.

SHERMAN COUNTY

Gibson Oil Co.'s No. 1 Bivins, Sec. 35, Blk. 3-B—100,000 ft. gas, 2,016-26 ft; T.D., 3,353 ft; 2,000 ft. S.W., 3,325-32 ft; preparing to set 5-in. csg., 3,410 ft.
Phillips Pet. Co. and Prairie O. & G. Co.'s No. 1 Price & Fuqua, C NE, Sec. 33, Blk. 2-B, G. H. & H. Sur.—100,000 ft. gas, 2,105-10 ft; T.D., 3,420 ft; 2,000,000 ft. gas, 3,325-3,420 ft. lime; 400 ft. wtr. in hole from 3,535 ft; run 6-in. csg. to 3,535 ft; hole full of wtr., 3,680 ft; S.D., 4,004 ft. for orders.

WHEELER COUNTY

Byrens et al's No. 1 Johnson, SW cor. NE, Sec. 85, Blk. A-5, H. & G. N. Sur.—Set 10-in., 605 ft.
Rook et al's (was Foster et al's) No. 1 S. H. McDonald, SE cor. NW SW, J. N. Lindsay Sur.—S.D. for fuel, 1,900 ft.

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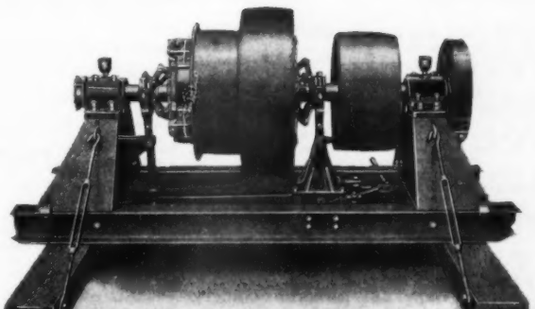

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Hatcher et al's No. 2 J. Hatcher, C NE SW, Sec. 80, Blk. 23, H. & G. N. Sur. ..... Drlg., 1,470 ft.
Mid-Kansas O. & G. Co.'s No. 1 J. F. Coates, Sec. 92, Blk. 17, H. & G. N. Sur. ..... Drlg., 1,890 ft.
Mid-Kansas O. & G. Co.'s No. 1 J. L. Newton, Sec. 92, Blk. 17, H. & G. N. Sur. ..... Drlg., 1,600 ft.
Rook & Angus' No. 1 Smock (Linkey) C SE SE, Sec. 5, Blk. 24, H. & G. N. Sur. ..... U.R. 8¼-in., 1,980 ft.
Sabien Oil Co.'s No. 1 E. L. Woodley, C SE SE, Sec. 21, Blk. 24, H. & G. N. ..... Cellar.
Smith Brady et al's No. 1 P. J. Sorenson, Sec. 53, Blk. A-4 ..... S.D., 2,120 ft. for orders.
Sun Oil Co.'s No. 1, G. Krc. C NW NW, Sec. 127, Blk. 23 ..... Drlg., 546 ft.
The Texas Co.'s No. 2 Morgan, Sec. 92, Blk. 17 ..... 1,000,000 ft. gas, 1,835 ft.; show oil, 2,327 ft.; drlg.
Vaughan et al's No. 1 M. Ackley ..... Location.
H. Vaughan et al's No. 1 C. C. George, C SE NW, Sec. 96, Blk. 17, H. & G. N. Sur. ..... Rig.
Vaughn et al's No. 1 B. Woodley, C SW NW, Sec. 21, Blk. 24, H. & G. N. Sur. ..... Location.
Vaughn et al's No. 1 A. Wood, C NW SW, Sec. 21, Blk. 24, H. & G. N. Sur. ..... Location.
Vaughn et al's No. 1-B M. Ackley, C NE NW, Sec. 4, Blk. 27, H. & G. N. Sur. ..... Rig on ground.
Kaufold et al's No. 1 E. R. Wallace ..... Spudded and S.D.
Woodtex Oil Co.'s No. 3 C. A. Linkey ..... Drlg., 2,160 ft.; G.W.
Pete Woodley's No. 1 J. Boyle ..... Drlg., 820 ft.

WILDCAT OPERATIONS IN WEST TEXAS

(Continued from Page 40)

CROCKETT COUNTY

V. T. Bolin & Co.'s No. 1 P. C. Coates, NW cor. SW Sec. 4, Blk. 2, I. & G. N. Sur. ..... Shut down 2,110 ft.
Dixie Oil Co.'s No. 1 George Thompson ..... Location.
J. S. Cosden, Inc., No. 1 Paul Perner, SW cor. Sec. 36, Blk. 2, I. & G. N. Sur. ..... Drlg. 805 ft.
Humble O. & R. Co.'s No. 2 P. J. Sorg Est. ..... Drlg. 2,331 ft.; hole full water 2,253 ft.
James Kelly et al's (was Corbett & Gill's) No. 1 Todd, C NE Sec. 43, Blk. WX, G. C. & S. F. Sur. ..... Top salt 993 ft.; show oil 1,948 ft.; 700 ft. sulphur water in hole 2,450 ft.; total depth 2,605 ft.; plugged back to 1,948 ft. and shot 120 qts. 1,909-45 ft.; hole filled 250 ft. with water with slight scum of oil.
Van McPhail's No. 1 George Thompson ..... Location.
Van Phail et al's No. 1 George Thompson ..... Location.
Osage Oil Corp.'s No. 2 Halff, 1,200 ft. down river from No. 1 in Sec. 70, Blk. 1, I. & G. N. Sur. ..... Total depth 1,040 ft.; shut down.
Osage Oil Co.'s No. 3 H. M. Halff, Sec. 70, Blk. 1, I. & G. N. R. R. Sur. ..... Shut down 150 ft.
W. W. Donnelly & Young's No. 1 Massey, Sec. 29, Blk. U-V ..... Shut down 530 ft.
World Oil Co.'s No. 1 Schneeman-B, Sec. 50, Blk. BB, G. C. & S. F. Sur. ..... Top salt 1,070 ft.; hole full salt water 2,210-15 ft.; set 6-in. 2,540 ft.; drlg. 2,830 ft.; hole full sulphur water; shut down 2,880 ft.
M. B. Wyrick et al's No. 1 H. M. Halff, Sec. 68, Block 1, H.&G.N. ..... Location.
Young & Donelly's No. 1 J. M. Shannon, C Sec. 11, Blk. 9, D. & S. E. Sur. ..... 7,000,000 ft. gas at 1,662 ft.; shut down 1,676 ft.

CULBERSON COUNTY

Deep Rock Oil Co.'s No. 3 Kloh-Rumsey, Sec. 21, Blk. 29, T. & P. Sur., T-1 (NE of No. 1) ..... Shut down 1,265 ft.
Deep Rock Oil Co.'s No. 1 J. P. Seay ..... Shut down 1,270 ft.; engine repairs.
Hickey & Stiver's No. 1 C. O. Finley ..... Cleaning out 550 ft.
James H. Gardner et al's No. 1 Radford, C SE Sec. 39, Blk. 62, Public School Land Sur. ..... Fish. 750 ft.
Scott & Dittman's No. 1 Miller, SW cor. NW NE, Sec. 1, School Blk. 97 ..... Rainbow 1,056 ft.; 300 ft. salt water 1,725 ft.; run. 8-in. casing 1,767 ft.

ECTOR COUNTY

Shoup et al's No. 2 C. P. Davis, C Sec. 10, Blk. 42 ..... Moving in material.

EL PASO COUNTY

Ellsworth & Haunt's No. 1 McKinney & Jones ..... Rig; drlg. water well.

FISHER COUNTY

Cranfill & Reynold's No. 1 J. A. Young, Sec. 208, B. B. B. & C. Sur. ..... Hole full salt water 2,400-35 ft.; swedging 8-in. 2,870 ft.; drlg. by tools.
R. W. Raney's No. 2 Maberry, Sec. 56, Blk. 1, T. & P. Sur. ..... Cleaning out 2,745 ft.

FOARD COUNTY

Clark et al's No. 1 Atkins ..... Lime 1,580-1,930 ft.; show gas 1,885 ft.; underreaming 6-in. 2,965 ft.
Fain-McGaha Oil Corp. and Roxana's No. 2 J. F. Mathews, Blk. 3, G. C. & S. F. Sur. ..... Spudded and shut down.
Marland Oil Co.'s No. 1 J. H. Minnick, C NE Sec. 74, Blk. B, H. & T. C. Sur. ..... Rig.

GARZA COUNTY

Emerald Oil Co.'s No. 1 Boren, NW NE Sec. 137, Blk. 5, Emerald Oil Co.'s No. 2 Boren, C NW NE Sec. 137, Blk. 5 ..... Shut down 2,600 ft.
Gulf Prod. Co.'s No. 1 E. P. Swenson-A, Sec. 67, Blk. 2, H. & G. N. Sur. ..... Top salt 660 ft.; drlg. 1,385 ft.
Marland Oil Co.'s No. 1 B. F. Pippin, C NW Sec. 1,210, W. C. Young Sur. (3,750-ft. test) ..... Top salt 495 ft.; top lime 2,075 ft.; drlg. gray lime 4,510 ft.
Texon & Marland's No. 1 Settles ..... Location.

GLASSCOCK COUNTY

Meriwether Oil Co.'s No. 1 L. S. McDowell, CNL Sec. 34, Blk. 34, T-2-S, T. P. R. R. Sur. ..... Set 10-in. 1,420 ft.; top lime 2,015 ft.; hole full sulphur water 2,710-50 ft.; shut down 3,075 ft.
R. R. Penn's No. 1 Hughes & Johnson ..... Building rig.
Location.

HOWARD COUNTY

Bristow & Merrick's No. 1 Dora Roberts ..... Total depth 1,602 ft.; moving star machine.
Coyle-Concord Oil Co.'s No. 4 Dora Roberts, Sec. 156, Blk. 29, W. & N. W. ..... Drlg. plug, 1,565 ft.
Green O. & R. Co.'s No. 1 H. R. Clay, SE cor. Sec. 127, Blk. 29, W-NW Sur. ..... Rig.
Henshaw et al's No. 1 W. R. Settles, SW SE SW Sec. 135, Blk. 29 ..... Hole full sulphur water 1,335-30 ft.; shut down 1,925 ft.
Lockhart & Co.'s No. 1 Dora Roberts, Sec. 157, Blk. 29, Lockhart et al's No. 2 Dora Roberts, Sec. 157, Blk. 29, W. & N. W. ..... Top lime 2,064 ft.; top pay 2,990 ft.; total depth 3,019 ft.; swabbed 100 bbls. hr.
M. O. G.
Marland Oil Co.'s No. 1 Clay-E, NW NE SE Sec. 138, Blk. 29 ..... Pay 2,480-2,500 ft.; swabbed approx. 160 bbls.; hole full salt water 2,360-70 ft.; total depth 3,656 ft.; plugged back to 2,960 ft.; tested 5 bailers oil 2,880-2,920 ft.; shot 100 qts. 2,880-2,920 ft.; tested 10 bbls. oil and 12 bbls. water; plugged back to 2,575 ft.; shut down to test.
Marland Oil Co.'s No. 1 Richardson, C NW Sec. 12, Blk. 32, T. & P. Sur., T-1-S ..... Top salt 870 ft.; hole full salt water 2,235-2,300 ft.; hole full sulphur water 2,790-2,800 ft. and 3,010 ft.; drlg. 3,430 ft.
Mays, Nixon & Flowers' No. 1 W. J. Flowers ..... Little salt at 976-97 ft.; top salt 1,114 ft.; shut down 1,390 ft.; preparing to start up.
Miley and Marland Oil Co.'s No. 1 C. D. Read, C NW, Sec. 12, Blk. 31, T. & P. Sur., T-1-N ..... Spudded and shut down 5 ft.
Oeland & McCaldin's No. 1 Dora Roberts, NW cor. SE Sec. 137, Blk. 29 ..... Drlg. 1,620 ft.; total depth 1,[illegible] ft.; shot 20 qts. 1,881-86 ft.; top pay 1,824-42 ft.
Owens & Sloan's No. 2 Dora Roberts, SW cor. SE Sec. 136, Blk. 29 ..... Topped pay 2,955 ft.; total depth 3,005 ft.; flowed 3,744 bbls.; now shut in.
Owen & Sloan's No. 3 Dora Roberts, Sec. 136, Blk. 29. Drlg. 1,270 ft.
Owen & Sloan's No. 4 Dora Roberts, Sec. 136, Blk. 29. Location.
Schermerhorn Oil Co.'s No. 1 Dora Roberts ..... Total depth 3,000 ft.; top pay 2,966 ft.; swabbing 1,500 bbls. first nine hours.
Sun Oil Co.'s No. 1 W. R. Settles, Sec. 135, Blk. 29. Shut down 2,390 ft. for orders; top lime 2,030 ft.
Sprague Oil Co.'s No. 1 Dora Roberts ..... Spudded and shut down.
Sweeney et al's No. 3 Chalk, Sec. 124, Blk. 29 ..... Location.
Sweeney et al's No. 4 Chalk, Sec. 124, Blk. 29 ..... Location.
Tate-Weekley & Tubbs' No. 3 Dora Roberts, NE cor. Sec. 156, Blk. 29, W. & N. W. R. R. Sur. ..... Drlg. 1,450 ft.
Texon O. & L. Co. and Marland Oil Co.'s No. 1 Mrs. Connaly, NE cor. Sec. 15, Blk. 33, T. & P. Sur. T-1-N ..... Top salt 1,425 ft.; hole full salt water 1,760-1,800 ft.; show oil 3,065 ft.; hole full sulphur water 3,500-55 ft.; hole full water 3,925-50 ft.; show oil 4,125-30 ft.; preparing to plug 4,400 ft.
Texon O. & L. Co. and Marland Oil Co.'s No. 2 W. R. Settles ..... Shut down for storage; sand at 1,280-84 ft.; total depth 1,298 ft.
Texon & Marland's No. 2 W. R. Settles-A ..... Rig; drlg. water well.
Weekly Oil Corp. et al's No. 1 Dora Roberts, Sec. 156, Blk. 29 ..... Fishing 1,465 ft.

HUDSPETH COUNTY

American Land Co.'s No. 1 Lockhart and Roseborough, C SE Sec. 5, School Blk. 21 ..... Shut down 180 ft. (cor. dep.h); to start up soon.
Western States Oil Co.'s No. 1 Moore, C SE Sec. 16, Blk. 71, T. & P. Sur., T-6 ..... Shut down for socket 1,175 ft.; 1,000,000 ft. of inflammable gas at 1,130 ft.; drlg. 1,200 ft.
Western States Oil Co.'s No. 1 Gardner & Moseley, NE NW Sec. 12, Blk. 18 ..... Shut down 1,000 ft.

IRION COUNTY

P. E. Hill's No. 1 Horney, NE cor. Sec. 2, Blk. 3, H. & T. C. Sur. ..... Hole full water 720-40 ft.; drlg. 930 ft.
F. E. Webb et al's No. 1 J. M. Nutt ..... Spudded and shut down 125 ft.

JEFF DAVIS COUNTY

J. K. Hughes Dev. Co.'s No. 2 Means ..... Shut down 2,600 ft.
Humble O. & R. Co.'s No. 2 Crecencio Flores, 1,130 ft. N and 350 ft. E of SW cor. Sec. 34, Blk. 58, T. & P. Sur., Twp. 8 ..... Shut down 3,920 ft.

JONES COUNTY

Garland & Diamond's No. 1 E. D. Glynn, SE cor. Sec. 18, Deaf & Dumb Asylum Lands ..... Fishing 2,430 ft.
Hutson & Weaver's No. 1-A Smith ..... Swabbing 45 bbls. daily sandy lime 2,498-2,504 ft.; making some water.
W. G. Stough and others' No. 1 J. P. Willis, J. C. Patterson Sur. No. 2 ..... Shut down 1,740 ft.

KENT COUNTY

Marland and Texon's No. 1 Bilby ..... Drlg. 422 ft.

KNOX COUNTY

Deep Rock Oil Co.'s No. 1 Moore ..... Drlg. 1,000 ft.
Deep Rock Oil Co.'s No. 1 Big Four, 1,270 ft. S and 2,590 ft. W of NE cor. Sec. 31, Blk. 4 ..... Shut down 3,513 ft.; may deepen to 4,000 ft.

LOVING COUNTY

Delaware Oil Co.'s No. 1 Lockhart & Ramsey ..... Shut down 650 ft.
Lockhart Bros.' No. 1 fee, Sec. 85, Blk. 33, H. & T. C. Sur. ..... Fishing 2,260 ft.
Owens & Sloan's No. 1 W. D. Johnson, C SE Sec. 30, Blk. 53, T-2, T. & P. Sur., elev. 2,924 ..... Top salt 955 ft.; shut down 3,700 ft.; half bailer sulphur water per hr. 3,600 ft.

LYNN COUNTY

Elpo Oil Co.'s No. 1 Nevols, NW cor. Sec. 6, Blk. C-42, School Lands ..... Shut down 675 ft.; drlg. water well 630 ft.
Hart Oil Corp.'s No. 1 C. O. Edwards A-1 ..... Shut down 576 ft.

MENARD COUNTY

Carpenter & Robbins' No. 1 Kothman, NW cor. SW SW Sec. 22 ..... 165 ft. 34.6 grav. oil at 414-15 ft.; fishing 415 ft.
J. C. Barnett and T. H. Drake's No. 1 Callan City Co. Ranch, Sec. 22 ..... Drlg. 528 ft.
Renfro et al's No. 1 J. Davis ..... Shut down 260 ft.

MIDLAND COUNTY

Gholson et al's (was Orbit Oil Co.'s) No. 1 Moreland, C SE Sec. 17, Blk. 39, T. & P. Sur., T-1-S ..... Drlg. 1,210 ft.
Shoup et al's No. 1 Roy Parks ..... Rig.

MITCHELL COUNTY

Boehm Drilling Co.'s No. 1 Harry Hyman, CNW SE Sec. 90, Blk. 29, W. & N. W. Sur. ..... Shut down 505 ft.
Magnolia Oil Co.'s No. 5 Foster, Sec. 17, Blk. 29, T. & P. ..... Drlg. 260 ft.
Paul Teas et al's No. 1 A. C. Mills, NW cor. C. A. O'Keefe Sub. 11, J. P. Smith Sur. ..... Total depth 1,766 ft. (S.L.); plugged back to 1,650 ft.; shot 200 qts. 1,550-1,640 ft.; est. 35 bbls.
Robert Thraves' No. 1 C. Way, Sec. 91, Blk. 27, T. & P. Sur., T-1-N ..... Total depth 2,508 ft.; shut down.

PECOS COUNTY

Benedum & Trees' No. 1 B. T. Corder ..... Cellar.
Bob Elmore's No. 2 Holmes ..... Top salt 435 ft.; shut down 640 ft.
Buell & Hagan's No. 1 Pryor & Wilson ..... Location.
Diamond Pet. Co.'s No. 1 Blackstone & Slaughter ..... Location.
M. C. Dibble & Hale's No. 1 Bonebrake, Sec. 115, Blk. 3, H. & G. W. Sur., elev. 2,555 ft. ..... Shut down 640 ft.
Everett et al's No. 1 J. Fields ..... Spudded and shut down.
Gibson Oil Corp.'s No. 1 R. R. Russell ..... Drlg. 1,500 ft.
George A. Henshaw et al's No. 1 B. T. Corder, C SW Sec. 74, Blk. 2, C. C. S. D. Sur. ..... Top salt 1,130 ft.; shut down 2,517 ft.
Kershaw & Livingston's No. 1 Cannon ..... Shut down 1,265 ft.
Mid-Kansas O. & G. Co.'s No. 1 Pryor &Wilson, NW cor. Sec. 3, Blk. 5, T. C. R. R. Sur. ..... Rigged up and shut down.
Miller & McNees' No. 1 W. C. Tyrrell ..... Cellar.
Moody Oil Corp.'s No. 1 B. T. Corder, C SW Sec. 77, Blk. 2, C. C. S. D. Sur. ..... Fishing 2,965 ft.
Quinby Oil Co.'s No. 2 Bennett, C NW 592, Blk. 105, G. C. & S. F. Sur., elev. 2,560 ft. ..... Cleaning out 1,465 ft.
Quinby Oil Co.'s No. 1 A. A. Gray, 660 ft. N and 1,320 ft. E SW cor. Sec. 592, Abst. 2,009, elev. 2,551 ft. .... Shut down 700 ft. to deepen.
B. J. Spikes' No. 1 George Brown ..... Shut down 625 ft.
Stidham & Thrasher's No. 1 Belgrade Ranch Co., Sur. 3, Mrs. S. Tompkins A-4,695 ..... Shut down 510 ft. for casing.
Transcontinental Oil Co.'s No. 1 Blackstone & Slaughter, Sec. 29, Blk. 129, St. L. Sur., elev. 2,539 ft. ..... 250 ft. sulphur water in black sand 1,160-80 ft.; small show oil 1,510 ft.; show gas 1,540 ft.; show oil 2,080 ft.; brown sand 3,560-70 ft.; 250,000 ft. gas at 3,565 ft.; drlg. black shale 4,915 ft.
Transcontinental Oil Co.'s No. 1 University, NE NW SW Sec. 18, Blk. 13 ..... Spudding.
Vacuum Oil Co.'s No. 1 Elsinore Cattle Co. ..... Drlg. 350 ft.
World Oil Co.'s No. 1 Kloh, Sec. 47, Blk. 45, Twp. 8, T. P. R. R. Sur., elev. 2,810 ft. ..... Shut down 730 ft.
World Oil Co.'s No. 1 Serf, C NE Sec. 10, Blk. 130, T. & St. L. Sur., elev. 3,435 ft. ..... Shut down 888 ft.

Yates Pool, Pecos County

Pandem Oil and Gibson Oil Co.'s (was Alleman & Bell's) No. 6 River Bed ..... Rig.

Pandem Oil and Gibson Oil Co.'s (was Allsman & Bell's) No. 8 River Bed ..... Hole full of fluid, 35% water; shut down 1,095 ft.
Pandem Oil and Gibson Oil Co.'s (was Allsman & Bell's) No. 9 River Bed ..... Location.
Pandem Oil and Gibson Oil Co.'s (was Allsman & Bell's) No. 12 River Bed ..... Shut down 485 ft.
Pandem Oil and Gibson Oil Co.'s (was Allsman & Bell's) No. 13 River Bed ..... Location.
Pandem Oil and Gibson Oil Co.'s No. 14 River Bed ..... Location.
Pandem Oil and Gibson Oil Co.'s No. 15 River Bed ..... Location.
California Co.'s No. 2 Yates, Sec. 34, Blk. 194 ..... Rig.
California Co.'s No. 13 Yates, Lease 1 ..... Top pay 1,310 ft.; drlg. 1,362 ft.
California Co.'s No. 10 Smith, Lease 3 ..... Shut down 1,030 ft.
California Co.'s No. 11 Smith, Lease 3 ..... Shut down 1,199 ft.
California Co.'s No. 12 Smith, Lease 3 ..... Cellar.
Day Bros. & McKnight's No. 1 Yates, NW cor. Sec. 58, Blk. 1 ..... Top salt 440 ft.; drlg. 1,150 ft.
Douglas Oil Co.'s No. 2 J. T. Sellman ..... Hole full salt water 795-860 ft.; 25 ft. sulphur water 1,614-15 ft.
Gulf Prod. Co.'s No. 8 Smith-A ..... Drlg. lime 1,265 ft.
Gulf Prod. Co.'s No. 9 Smith-A ..... Drlg. lime 1,282 ft.
Gulf Prod. Co.'s No. 8, I. G. Yates, Runnels Co. School Land No. A-2,169 ..... Location.
Humble Oil Co.'s No. 4 M. A. Smith-B ..... Top pay 1,522 ft.; flowing 60 bbls. hr.; drlg. 1,694 ft.
McDonald et al's No. 1 A. A. Parsell, C NW SE Sec. 23, Blk. A, G. C. & S. F. R. R. Sur. ..... Rig.
Madza and Savoy's No. 2 Smith, Sec. 24, Blk. 194 ..... Location.
McMan and Marland's No. 16 Yates ..... Rig.
Marland Oil Co.'s No. 11 Yates-A ..... Location.
Marland Oil Co.'s No. 12 Yates-A ..... Location.
Marland Oil Co.'s No. 13 Yates-A ..... Location.
Michaelson & Tabot's No. 1 River Bed ..... Spudded and shut down.
Mid-Kansas and Transcontinental's No. 14 Yates-A, Sec. 32, Blk. 194, G.C.&S.F. Sur. ..... Waiting on machine.
Mid-Kansas and Transcontinental's No. 15 Yates-A ..... Drlg. 400 ft.
Mid-Kansas and Transcontinental's No. 16 Yates-A ..... Fish. 626 ft.
Mid-Kansas and Transcontinental's No. 17 I. G. Yates-A, Sec. 31, Blk. 194 ..... Location.
Mid-Kansas and Transcontinental's No. 10 Yates-B, Sec. 61, Blk. 1 ..... Top pay 1,208 ft.; drlg. 1,307 ft.
Mid-Kansas and Transcontinental's No. 12 Yates-B ..... Drlg. 700 ft.
Mid-Kansas and Transcontinental's No. 18 Yates-B ..... Show oil 1,095 ft.; flowed sulphur water 1,103 ft.; plugged back to 1,087 ft.; 400 ft. water; 300 ft. oil in hole.
Mid-Kansas and Transcontinental's No. 19 Yates-B ..... Top pay 1,118 ft.; shut down 1,224 ft.; flowed 804 bbls. through 4-in. line in 14 hours.
Mid-Kansas and Transcontinental's No. 21 Yates-B ..... Top pay 956 ft.; drlg. 1,060 ft.
Mid-Kansas and Transcontinental's No. 22 Yates-B ..... Drlg. 20 ft.
Mid-Kansas and Transcontinental's No. 6 Yates-C ..... Rigging up.
Mid-Kansas and Transcontinental's No. 10 Yates-C ..... Location.
Mid-Kansas and Transcontinental's No. 1 Yates-F ..... Top pay 1,152 ft.; drlg. 1,188 ft.
Mid-Kansas and Transcontinental's No. 2 M. A. Smith .. First oil and gas show 1,095 ft., top pay 1,110 ft.; shut down 1,245 ft.; flowing 97 bbls.
Mid-Kansas and Transcontinental's No. 7 Smith-Taylor... Top pay 1,380 ft.; drlg. 1,455 ft.; flowed 919 bbls. 7 hrs.
Mid-Kansas and Transcontinental's No. 9 Smith-Taylor... Waiting on machine.
Mid-Kansas and Transcontinental's No. 10 Smith-Taylor.. Top pay 1,264 ft.; drlg. 1,272 ft.
Mid-Kansas and Transcontinental's No. 11 Smith-Taylor.. Drlg. 900 ft.
Mid-Kansas and Transcontinental's No. 12 Smith-Taylor.. Drlg. 1,180 ft.
Mid-Kansas and Transcontinental's No. 13 Smith-Taylor.. Cellar.
Mid-Kansas and Transcontinental Co.'s No. 14 Smith-Taylor, Sec. 33, Blk. 194, G. C. & S. F. R. R. Sur. .... Cellar.
Oregon Oil Corp.'s No. 1 Yates ..... Shut down 835 ft.
Phillips Pet. Co.'s No. 1 Mrs. M. A. Smith ..... Drlg. 1,240 ft.
Skelly Oil Co.'s No. 1 J. H. Tippett, Runnels County School Land A-2,169, Sec. 108, Blk. 194, G. C. & S. F. R. R. ..... Cellar.

PRESIDIO COUNTY

Headlock & Miller's No. 1 Tootle Est., Sec. 122, Blk. 3, D. & P. Sur., elev. 2,912 ft. ..... Salt water 2,610 ft.; total depth 3,003 ft.; shut down for orders.
Humble O. & R. Co.'s No. 1 Hendricks-C, SE cor. Sec. 32, Blk. 26 ..... Rigging rotary.
Humble O. & R. Co.'s No. 1 J. B. Walton-B, SE cor. N half Sec. 47, Blk. 26 ..... Building derrick.
Humble O. & R. Co.'s No. 1 J. B. Walton-A, NW cor. Sec. 48, Blk. 26 ..... Building derrick.
Humble O. & R. Co.'s No. 2-A Sec. 34, Blk. B-5 ..... Top salt 1,340 ft.; top lime 2,228 ft.; shut down 2,500 ft.
Humble O. & R. Co.'s No. 3 Grisham-Hunter, Sec. 34, Blk. B-5 ..... 5,000,000 ft. gas from 2,195 ft.; spraying 100 bbls. 2,896 ft.; killing well to deepen; total depth 2,898 ft.; shut down.
Humble O. & R. Co.'s No. 5 Grisham-Hunter, SW cor. NE Sec. 34, Blk. B-5 ..... Top lime 2,398 ft.; big gas 2,800 ft.; top salt 1,415 ft.; top pay 2,968 ft.; total depth 2,979 ft.; flowed 175 bbls. hr.
Pinto Canyon Oil Co.'s No. 1 Fields, 1,760 ft. S and E NW cor. Sec. 74, Blk. 2, D. & P. Sur. ..... Location.

REAGAN COUNTY

California Oil Co.'s No. 4 University, NW cor. Sec. 3, Blk. 7 ..... Location.
Hagan & Emch's No. 1 E. W. Loftin ..... Fishing 475 ft.
Marland Oil Co.'s No. 1 University, SE cor. SW Sec. 26, Blk. 8 ..... Location.
Moody Oil Co.'s No. 1 R. A. Walters ..... Rig.
Roxana Pet. Co.'s No. 1 Sawyer Cattle Co., 3,000 ft. S of CNL Sec. 15, Blk. A, R. Casey Sur. ..... Rig.
Texon O. & L. Co.'s No. 1-B University, Group 1 ..... Top pay 6,250 ft.; 2,000 ft. oil; drlg. 7,580 ft.
White et al's No. 1 Shofner & Sterling, NE cor. NW Sec. 10, 2 m. N of Big Lake ..... Top salt 1,275 ft.; hole full fresh water 2,155 ft.; run. 8-in. 2,175 ft.; drlg. 2,282 ft.

REEVES COUNTY

Exploration Co.'s No. 1 A. A. Kinney, 1,500 ft. W of NE cor. Sec. 26, Blk. C-18, Public School Land, elev. 2,847 ft. ..... Show oil 1,105-10 ft.; hole full sulphur water 1,600 ft.; setting 10-in. casing 1,640 ft.; shut down for orders.
Grisham-Hunter Corp.'s No. 1 Rathge & Connor, 600 ft. from N line and 5,760 ft. from W line of Sec. 26, Blk. 2, H. & G. N. ..... Drlg. 775 ft.
David R. Thompson's No. 1 A. A. Eddins ..... Total depth 5,130 ft.; shut down; to drill deeper.
Vacuum Oil Co.'s No. 1 Grisham-Hunter ..... Set 15½-in. casing 533 ft.; drlg. 1,012 ft.
World Oil Co.'s No. 1 Biggs, C SE Sec. 85, Blk. 113, Public School Land Sur., elev. 3,068 ft. ..... Drlg. 2,300 ft.
World Oil Co.'s No. 1 Duff, 1,500 ft. from S and 850 ft. from NE lines, R. S. Johnson Sur. No. 68, elev. 3,774 ft. ..... Top Delaware lime 4,185 ft.; hole full brackish salt water 4,362-4,500 ft.; plugged back to 4,237 ft.; shot 70 qts. 4,135-4,235 ft.; little oil in hole; shut down 4,500 ft.; moved tools to No. 1 Biggs.

RUNNELS COUNTY

Empire G. & F. Co.'s No. 1 C. C. Gray ..... Hole full fresh water 2,350-57 ft.; small show oil 2,460-90 ft.; drlg. 2,505 ft.
Gibson & Johnson's No. 1 Harris Est., Juliana Voske Cabrera Sur. ..... Location.
Gibson & Johnson's No. 1 H. P. Serratt, C SE NW Sec. 150, E. T. R. R. Sur. ..... Drlg. 1,450 ft.
Globe Oil Co.'s No. 1 J. H. Webb ..... Straightreaming 1,365 ft.
Jones Oil Syndicate's No. 1 W. Hale ..... Fish. pipe 1,905 ft.
Jones Oil Syndicate's No. 1 W. Hale (Runnells), NE cor. Sub. 29, Sec. 109, E. T. R. R. Co. sur. ..... New location.
McLean et al's No. 1 G. W. Clayton ..... Shut down 1,050 ft.
Marland Oil Co.'s and E. L. Smith Oil Co.'s No. 1 A. C. Herring, C Sec. 121, E. T. R. R. Sur. (3,000-ft. test).. New location.
Marland Oil Co.'s No. 1 R. R. Russell, near CSL J. F. G. Sur. ..... New location.
Kennedy et al's No. 1 J. E. Tally ..... Shut down 1,720 ft.
May et al's No. 1 J. M. Schneider, John Wall Sur. ..... ⅛ baller salt water 1,033 ft.; hole full water 1,100-20 ft.; underreaming 1,325 ft.
Miles Oil Co.'s No. 1 Charles Ray, Sec. 21, T. & N. O. Sur. ..... Cellar and machine.
Miles Oil Co.'s No. 1 L. S. Lawhon, NE cor. Sec. 68 ..... Show gas 960-80 ft.; shut down for 6-in. 2,310 ft.
Royal Pet. Co.'s No. 1 A. C. Willingham ..... Preparing to run 10-in. 1,410 ft.
Sillix Pet. Co.'s No. 1 Malone ..... Location.
Swensondale Oil Co.'s No. 1 E. A. Werner ..... Hole full water 2,000 ft.; shut down 2,080 ft.
Vacuum Oil Co.'s No. 2 R. M. McMillan ..... Underreaming 8¾-in. casing 2,348 ft.
Watchorn O. & G. Co.'s No. 1 J. L. King ..... Hole full salt water 1,633-91 ft.; straightreaming 2,680 ft.

SCHLEICHER COUNTY

Beavers & Leath et al's No. 1 J. A. and W. T. Whitten, C NW Sec. 35, Blk. 11, T. O. Sur. ..... Shut down 400 ft.

SCURRY COUNTY

J. B. Mims et al's No. 1 J. J. Koonsman, Sec. 220, Blk. 2, H. & T. C. Sur. ..... Tearing down rig to move to new location.

STERLING COUNTY

Orr et al's (to be taken over by Empire G. & F. Co.) No. 1 Neal Reed, CNL Sec. 15, Blk. 30, W. & N. W. Sur. ..... Shut down 1,390 ft. (cor.).

SUTTON COUNTY

National Potash Co.'s No. 1 J. N. Ross ..... Coring lime 991 ft.

TAYLOR COUNTY

A. J. Brown et al's No. 1 Henslee, NE cor. Sec. 5, Blk. 4, S. P. R. R. Survey ..... Drlg. 2,695 ft.
Dorsing & Perrine's No. 1 J. A. Hammer, C N 100 acres, Sec. 23, Blk. 19, T. & P. Sur., elev. 1,804 ft. ... Shut down 455 ft.
Gilbert Johnson and Day Bros.' No. 1 C. M. Brown, Sec. 1, Blk. 6, T. & P. Sur. ..... Drlg. 2,360 ft.; hole full of water 2,170-2,220 ft.
Owen & Sloan's No. 1 Lattimer, Sec. 14, Blk. 9, T. & P. Sur. ..... Shut down 2,825 ft.

TERRELL COUNTY

Big Bend Oil Co.'s No. 1 Bassett ..... Location.
Champlin Ref. Co.'s No. 1 Corder, C Sec. 110, Blk. 1, C. C. S. D. Sur. ..... Set 15½-in. at 625 ft.; drlg. 1,050 ft.
Reep Rock Oil Co.'s No. 1 H. C. Nolke, Sec. 4, Blk. A-2, T. C. R. R. Sur. ..... Underreaming 720 ft.
Humble Oil Co.'s No. 1 University, Sec. 15, Blk. 34 ..... Shut down for fish. tools 980 ft.
Milham Exploration Co.'s No. 1 Bassett, Sec. 77, Blk. Y, W. H. Robertson Sur. ..... Run. 8-in. 1,788 ft.; fish. 2,409 ft.
Miller Bros.' No. 1 Allison & Burke, CNW Sec. 10, Blk. 176, Texas-Mex. R. R. Sur. ..... Building rig.
Woodley & Jones' No. 1 Pankenham, C SE NW Sec. 43, Blk. B-2, C. C. S. D. R. G. & N. G. R. R. Sur. .... Location.

TERRY COUNTY

Kingsland O. & P. Co.'s No. 1 Brownfield, C NW SW SW Sec. 7, Blk. 1-A, E. L. R. R. Sur. ..... Slight show gas 2,230 ft.; drlg. red beds 3,295 ft.

TOM GREEN COUNTY

George Amery's No. 1 Wilkey, C SW Sec. 2, B. A. L. Sur. ..... Location.
Collins et al's No. 1 Jones, CSL Sec. 646, Shaffer Sur. .... Rig.
Cox et al's No. 1 Llano ..... Drlg. 520 ft.
Fitzgerald & Tallaferro's No. 1 Bennett ..... Trying to shut off water 1,920 ft.
Lone Eagle Oil Co.'s No. 1 Sharp, SE W Elzei Sur No. 167 ..... Material on ground.
Marland Oil Co.'s No. 1 J. W. Johnson, C SE Sec. 6, R. B. Sanderson Sur. ..... Hole full water 2,020-45 ft.; shut down 3,500 ft.
Marland Oil Co.'s No. 1 J. W. Johnson-A ..... Fishing 3,130 ft.; setting 6-in. casing 3,173 ft.
Tulsa Oil Co.'s No. 1 Adams, C SW Sec. 163, Blk. 11, S. P. R. R. Sur. ..... Shut down 1,020 ft.
Haubelt et al's No. 1 Johnson ..... Location.
Haubelt et al's No. 2 Johnson ..... Shut down 1,201 ft.
World Oil Co.'s No. 1 Mrs. F. T. March ..... Location.
World Oil Co.'s No. 2 Pulliam, Sec. 25, Blk. 4, H. & T. C. Sur., elev. 1,823 ft. ..... Setting 8-in. casing 655 ft.

UPTON COUNTY

Mark Curtis et al's (was Hultz et al's) No. 2 Giddings, 5,336 ft. S and 6,678 ft. E of NW cor. Throckmorton C. School Land, League 1, elev. 2,757 ft. ..... Shut down 975 ft.
Southern C. O. P. Co.'s No. 1 C. W. Hobbs ..... Flowed sulphur water 2,340-80 ft.; more water at 3,249 ft.; shut down.
The Texas Company and Cordova Union's No. 1 Union Land, Sec. 23, Blk. 35, H. & T. C ..... Top pay 2,098 ft.; swabbed 60 bbls. in 36 hrs. at 2,271 ft., 2 per cent water; 2,200 ft. sulphur water 2,390-2,405 ft.; shut down 2,125 ft.; to plug back.
Wise & Jackson's No. 1 J. H. Porter, SW cor. SW SW Sec. 184, Blk. E, elev. 2,592 ft. ..... Top pay 3,419 ft.; total depth 3,517 ft., gray lime; shut down.

VAL VERDE COUNTY

A. Blume et al's No. 1 Moore Est., Sec. 183, J. Mitchell Sur., elev. 953 ft. ..... Shut down 3,000 ft.
Curso Williams' No. 1 Holman, NE NE Sec. 5, Blk. N, G. H. & S. A. Sur. ..... Shut down 2,940 ft.
East Del Rio Oil Co.'s No. 1 Russell, SE cor. Sec. 183, Del Rio Town Sur., elev. 941 ft. ..... Total depth 3,190 ft.; shut down.
Magnolia Pet. Co.'s No. 1 Whitehead, Sec. 81, D. G. C. & S. F. Sur., elev. 1,770 ft. ..... Drlg. 6,070 ft.
Independent Operator's No. 1 Whitehead, SE SE Sec. 30, Blk. 4, I. & G. N. Sur., elev. 1,175 ft. ..... Shut down 3,900 ft.
O. O. Owens' No. 1 Mills, Sec. 128, Blk. 1, I. & G. N. Sur., elev. 2,130 ft. ..... Gas sand 2,491-2,520 ft.; tested 125,750 ft. gas; reset 8-in. 2,511 ft.; shut down 4,210 ft.
W. B. Thraves et al's No. 1 W. E. Wilson ..... Shut down 905 ft.

WARD COUNTY

Alfredo Del Cambre's No. 1 Lee Monroe, Sec. 50, Blk. 33, H.&T.C. Sur. ..... Location.
E. H. Devore et al's No. 1 Black, Sec. 214, Blk. 34, H.&T.C. ..... Location.
Selby Oil Co. et al's No. 1 A. G. Dooley et al, Sec. 85, Blk. A, G. M. M & A. Sur. ..... Shut down 600 ft.

WINKLER COUNTY

Amerada Pet. Corp.'s No. 1 J. B. Walton, SW cor. NW Sec. 48, Blk. 26, elev. 2,833 ft. ..... Rerun 8-in.; water shut off; making 15,000,000 ft. gas and slight spray oil; total depth 2,419 ft.; shut down.
Atlantic O. P. Co.'s No. 2 Grisham-Hunter-A, Sec. 34, Blk. B-5 ..... Shot 480 qts. 2,850-2,999 ft.; total depth 2,985 ft.; swabbed 200 bbls.
Atlantic O. P. Co.'s No. 3 Grisham-Hunter-A, Sec. 34, Blk. B-5 ..... Topped salt 1,315 ft.; top lime 2,525 ft.; drlg. 2,865 ft.; show oil 2,825 ft.
Atlantic O. P. Co.'s No. 4 Grisham-Hunter-A, Sec. 34, Blk. B-5 ..... Top salt 1,470 ft.; top lime 2,472 ft.; drlg. 2,950 ft.
Atlantic O. P. Co.'s No. 5 Grisham-Hunter-"A", SW NE SW Sec. 34, Blk. B-5 ..... Drlg. 315 ft.
Atlantic O. P. Co.'s No. 6 Grisham-Hunter, NW cor. SE SW Sec. 34, Blk. B-5 ..... Drlg. 265 ft.
Atlantic O. P. Co.'s No. 6 Grisham-Hunter, NW SE SW Sec. 34, Blk. B-5 ..... Rigging.
Atlantic O. P. Co.'s No. 2 Grisham-Hunter-E, NW cor. Sec. 41, Blk. B-5 ..... New location.
Atlantic O. P. Co.'s No. 3 Grisham-Hunter-"E", CNL N half NE Sec. 41, Blk. B-5 ..... Location.
Atlantic O. P. Co.'s No. 4 Grisham-Hunter-E, SE NE NE Sec. 41, Blk. B-5 ..... Building rig.
Atlantic O. P. Co.'s and Collett's No. 3 Hendricks-F, NW NE NW Sec. 40, Blk. 44 ..... Rigging.

Atlantic O. P. Co.'s No. 1 Grisham-Hunter-C (was Lemar) SW cor. Sec. 40, Blk. B-5 ..... Total depth 2,978 ft.; gas pressure split connections; est. 75,000,000 ft. gas; running wild; trying to kill gas; top salt 1,573 ft.; top lime 2,200 ft.

Atlantic O. P. Co.'s No. 3 Ida Hendricks-D, NW SE NW Sec. 29, Blk. B-5 ..... New location.

Atlantic O. P. Co.'s No. 4 Ida Hendricks-D, NE SW NW Sec. 29, Blk. B-5 ..... Location.

Atlantic O. P. and Collett's No. 1 Ida Hendricks-F, NE cor. W half NW Sec. 40, Blk. 26 ..... Show gas 2,522 ft.; set 6-in. casing. 2,685 ft.; 1 5-bbl. head and 5,000,000 ft. gas; shut down 2,733 ft.

Atlantic O. P. and Collett's No. 2 Ida Hendricks-F ..... Drlg. 1,522 ft.

V. T. Bolin et al's No. 1 Brown ..... Shut down 15 ft.

Cranfill Bros. and California Co.'s No. 1 M. J. Bashara, at cor. Secs. 10, 11, 22 and 23, School Blk. 77 ..... Total depth 3,503 ft. (s.l.m.); shut down for orders; top salt 1,100 ft.

Cranfill & Reynolds' No. 2 Hendricks-C, SW SE SW Sec. 35, Blk. 76 ..... Drlg. 708 ft.

Cranfill & Reynolds' No. 1 Hendricks-C ..... Cem. 8-in. 2,408 ft.; top lime 2,408 ft.; top salt 1,751 ft.; 12,000,000 ft. gas; show oil; total depth 2,733 ft.; shut down.

Eastland Oil Co. and Arnold's No. 1, Sec. 35, Blk. B-5 ... Show oil 2,675 ft.; top pay 2,710 ft.; drlg. by tools 2,755 ft.; flowing 60 bbls.

Gibson-Johnson's No. 1 Leck, C SW Sec. 3, Blk. 74..... Drlg. 750 ft.

Gulf Prod. Co.'s No. 2T. G. Hendricks, NE NW NW Sec. 34, Blk. B-5 ..... Rig standing.

Gulf Prod. Co.'s No. 8 T. G. Hendricks, Sec. 34, Blk. B-5.. Show oil and gas in lime 2,483 ft.; top lime 2,480 ft.; standardizing 2,486 ft.

Gulf Prod. Co.'s No. 9 T. G. Hendricks, Sec. 34, Blk. B-5.. Top salt 1,837 ft.; standardizing 2,562 ft.

Gulf Prod. Co.'s No. 10 T. G. Hendricks, SW cor. NE Sec. 45, Blk. 26 ..... Top salt 1,973 ft.; total depth 2,315 ft.; mixing to kill gas.

Gulf Prod. Co.'s No. 11 T. G. Hendricks, Sec. 34, Blk. B-5.. Drlg. anhydrite 1,545 ft.

Gulf Prod. Co.'s No. 12 T. G. Hendricks, Sec. 34, Blk. B-5.. Drlg. hard sand 400 ft.

Gulf Prod. Co.'s No. 13 T. G. Hendricks, Sec. 40, Blk. B-5.. Drlg. 1,190 ft.

Gulf Prod. Co.'s No. 15 T. G. Hendrick, C NW SW NW Sec. 40, Blk. B-5 ..... Location.

Humble O. & R. Co.'s No. 6 Grisham-Hunter ..... Drlg. 320 ft.

Humble O. & R. Co.'s No. 7 Grisham-Hunter ..... Shut down 880 ft.

Humble O. & R. Co.'s No. 8 Grisham-Hunter ..... Drlg. 1,210 ft.

Humble O. & R. Co.'s No. 9 Grisham-Hunter, NE NE Sec. 34, Blk. B-5 ..... Drlg. 305 ft.

Humble O. & R. Co.'s No. 4 Ida Hendricks-B, SE N half SE Sec. 29, Blk. B-5 ..... New location.

Humble O. & R. Co.'s No. 5 Ida Hendrick-"B", NW NE SE Sec. 29, Blk. B-5 ..... Derrick.

Humble O. & R. Co.'s No. 6 Ida Hendrick-"B", NE NW SE Sec. 29, Blk. B-5 ..... Location.

Independent O. & G. Co.'s No. 3 Grisham-Hunter, SE NW SW Sec. 34 ..... Location.

Independent O. & G. Co.'s No. 4 Grisham-Hunter, NE SW SW Sec. 34 ..... Building rig.

Independent O. & G. Co.'s No. 5 Grisham-Hunter, SE SW SW Sec. 34 ..... Drlg. 270 ft.

Independent O. & G. Co.'s No. 7 Grisham-Hunter, NW SW SW Sec. 34 ..... Top salt 1,541 ft.; top lime 2,495 ft.; drlg. 2,830 ft.

Independent O. & G. Co.'s No. 8 Grisham-Hunter, SW NW SW Sec. 34 ..... Gas 2,597 ft.; top pay 2,890 ft.; total depth 2,927 ft.; initial prod. 1,200 bbls. per day.

Independent O. & G. Co.'s No. 1 Vardeman-B, SE cor. E. half NW Sec. 41, Blk. B-5 ..... 8-in. casing 2,597 ft.; top lime 2,591 ft.; drlg. 2,680 ft.

Independent O. & G. Co.'s No. 2 Vardeman-B, NE SE NW Sec 41, Blk. B-5 ..... Top salt 1,775 ft.; top pay 2,575 ft.; total depth 2,743 ft.; 8,931 bbls. in 24 hrs.; pinched.

Independent O. & G. Co.'s No. 3 Vardeman-B, SE NE NW Sec. 41, Blk. B-5 ..... Top salt 1,800 ft.; top lime 2,310 drlg. 2,660 ft.

Independent O. & G. Co.'s No. 4 Vardeman-B, SW cor. E half NW Sec. 41, Blk. B-5 ..... 8-in. casing 2,328 ft.

Independent O. & G. Co.'s No. 5 Vardeman-B, NW SE NW Sec. 41, Blk. B-5 ..... Shut down 664 ft.

Independent O. & G. Co.'s No. 1 E. W. Cowden, SE NW NW Sec. 36, Blk. B-5 ..... Rigging up rotary.

Liner Drlg. Co.'s No. 1 Seth-Campbell, NE cor. Sec. 2, Blk B-5 ..... Drlg.

Landreth Prod. Corp.'s No. 1 Hendricks-A, SE cor. SW Sec. 29, Blk. B-5 ..... Shut down 450 ft.

Landreth and Roxana's No. 2 Ida Hendricks-A, Sec. 29, Blk. B-5 ..... Top salt 1,395 ft.; top lime 2,861 ft.; drlg. 3,008 ft

Marland Oil Co.'s No. 1 T. G. Hendricks, SE cor. W half Sec. 33, Blk. 26 ..... Drlg. 301 ft.

Marland Oil Co.'s No. 2 T. G. Hendricks, NE SE SE Sec. 33, Blk. 26 ..... New location.

Marland Oil Co.'s No. 3 T. G. Hendricks, NE SE SW Sec. 33, Blk. 26 ..... New location.

Magnolia Pet. Co.'s (was G. M. Church et al's) No. 2 Ida Hendricks ..... New location.

Magnolia Pet. Co.'s No. 3 Ida Hendricks ..... Show oil 2,750 ft.; top pay 2,865 ft.; total depth 2,961 ft.; ran 5-in. with packer to 2,955 ft.; failed to shut off water; plugging back.

Magnolia Pet. Co.'s No. 5 Ida Hendricks ..... Total depth 2,763 ft.; top lime 2,423 ft.; flowing 275 bbls.

Magnolia Pet. Co.'s No. 6 Ida Hendricks, Sec. 29, Blk. B-5 ..... Top salt 1,624 ft.; top lime 2,509 ft.; total depth 2,915 ft.; setting 5 3/16-in. casing.

Magnolia Pet. Co.'s No. 7 Ida Hendricks ..... Top salt 1,430 ft.; top lime 2,420 ft.; drlg. 2,640 ft.

Magnolia Pet. Co.'s No. 8 Ida Hendricks ..... Top lime 2,448 ft.; drlg. 2,476 ft.

Murchison Oil Co. et al's No. 1 Grisham-Hunter-B, NE cor. SW SW Sec. 35, Blk. B-5 ..... Drlg. 180 ft.

Murchison Oil Co. et al's No. 2 Grisham-Hunter-B ..... Top salt 1,335 ft.; shut down 2,427 ft.

Murchison Oil Co. et al's (was Marland Oil Co.'s) No. 4 Grisham-Hunter-B ..... Location.

Mining & Engineering Co.'s No. 1 T. G. Hendricks, Sec. 10, Blk. B-12 ..... Top lime 2,500 ft.; cleaning out 2,868 ft.

Murchison Oil Co. and Cranfill Bros.' No. 2 Grisham-Hunter-A ..... Drlg. 510 ft.

Murchison Oil Co. and Cranfill Bros.' No. 4 Grisham-Hunter ..... Location.

The Texas Company's No. 4 Hendricks ..... Location.

The Texas Company's No. 5 Hendricks ..... Cem. 20-in. 336 ft.

The Texas Company's (was Pure Oil Co.'s) No. 1 Hendricks-B, NE cor. SE Sec. 34, Blk. B-5 ..... Drlg. 1,101 ft.

The Texas Company's (was Pure Oil Co.'s) No. 2 Hendricks-B ..... Show gas 2,350-60 ft.; show oil 2,320 ft.; 15,000,000 ft. gas at 2,490 ft.; more gas 2,664 ft.; 40,000,000 ft. gas at 2,720 ft.; rigging cable tools 2,751 ft.

The Texas Company's (was Pure Oil Co.'s) No. 3 Hendricks-B ..... Top lime 2,327 ft.; top pay 2,805 ft.; flowing small heads; fishing 2,876 ft.

The Texas Company's (was Pure Oil Co.'s) No. 4 Hendricks-B ..... Cem. 8-in. 2,438 ft.; 6,000,000 ft. gas 2,600 ft.; drlg. lime 2,880 ft.

The Texas Company's No. 5 Hendricks-B, SE SW SE Sec. 34, Blk. B-5 ..... Shut down 2,405 ft.; top lime 2,404 ft.

The Texas Company's (was Pure Oil Co.'s) No. 6 Hendricks-B ..... 8-in. casing 2,422 ft.; total depth 2,431 ft.; top lime 2,420 ft.

Top salt 1,315 ft.; top lime 2,388 ft.; shut down 2,390 ft.

The Texas Company's No. 1 Grisham-Hunter-C ..... Drlg. 1,242 ft.

Republic Prod. Co.'s No. 1-A Grisham-Hunter-B, SW cor. E half SE Sec. 41, Blk. B-5 ..... Top salt 1,240 ft.; top lime 2,135 ft.; shut down 2,299 ft.

Republic Prod. Co.'s No. 2 Grisham-Hunter-B ..... Top salt 1,280 ft.; top lime 2,197 ft.; total depth 2,980 ft.; preparing to test.

Republic Prod. Co.'s No. 3 Grisham-Hunter-B, NE cor. SE Sec. 41, Blk. B-5 ..... Drlg. 2,300 ft.

Republic Prod. Co.'s No. 3 Hendricks-A, NE E half SW Sec. 45, Blk. 26 ..... Top salt 1,240 ft.; top lime 2,135 ft.; fishing 2,302 ft.

Roxana Pet. Corp.'s No. 1 Grisham-Hunter-A, SW cor. E half NW Sec. 45, School Blk. 26 ..... Top lime 2,428 ft.; total depth 2,828 ft.; flowed aver. 1,500 bbls. past week, pinched.

Roxana Pet. Corp.'s No. 2 Grisham-Hunter-A, SE cor. E half NW Sec. 45, Blk. 26 ..... Top lime 2,351 ft.; drlg. 2,648 ft.

Roxana Pet. Corp.'s No. 3 Grisham-Hunter-B ..... Shut down 2,740 ft.; 8,000,000 ft. gas.

Roxana Pet. Corp.'s No. 2 Grisham-Hunter-C, SE cor. N half NW Sec. 29, Blk. B-5 ..... Top salt 1,405 ft. showed oil 2,880-83 ft., 2,910-14 ft. and 2,919-36 ft.; top pay 2,940 ft.; total depth 2,989 ft.; flowed 238 bbls. per hr. open, 33 per cent water; pinched to 3,540 bbls. 3 per cent water; plugged back to 2,943 ft.; no production.

Roxana Pet. Corp.'s No. 5 Grisham-Hunter-C ..... Top lime 2,588 ft.; total depth 2,935 ft.; 1,200 ft. fluid.

Roxana Pet. Corp.'s No. 2 Grisham-Hunter-D ..... Top salt 1,340 ft.; run. 8-in. 2,356 ft.; stand. cem.; top lime 2,346 ft.; shut down 2,763 ft .

Roxana Pet. Corp.'s No. 3 Grisham-Hunter-D ..... Drlg. 2,115 ft.

Roxana Pet. Corp.'s No. 1 Grisham-Hunter-E ..... Shut down 600 ft.

Sheldon & Burden's No. 1 Ida Hendricks, SW cor. SE Sec. 28, Blk. B-5 (10-a. tract) ..... Top salt 1,260 ft.; top lime 2,609 ft.; top pay 2,719 ft.; small increase 2,914 ft. and 2,973 ft.; drlg. dry lime 3,210 ft.

Southern C. O. P. Co.'s No. 2 Ida Hendricks T-88-B ..... Total depth 2,659 ft.; cem. 6-in. in lime; stand. cem.

Southern C. O. P. Co.'s No. 2 T-89 Grisham-Hunter-A, Sec. 35, Blk. B-5 ..... Standardizing 2,301 ft.; shut down.

Southern C. O. P. Co.'s No. 3 T-89-A Grisham-Hunter-A.. Shut down 2,352 ft.

Southern C. O. P. Co.'s No. 4 T-89 Grisham-Hunter-A ... Rig.

Southern C. O. P. Co.'s No. 4 T-89-A Grisham-Hunter-A.. Location; rotary moved away.

Texon O. & L. Co.'s No. 2 Grisham-Hunter-A ..... 5,000,000 ft. gas 2,260-2,500 ft.; 15,000,000 ft. gas 2,646-56 ft.; total depth 2,725 ft.; rig was wrecked when gas blew tools out of hole; est. 200,000,000 ft.; repairing rig; shut down 2,727 ft.

Texon O. & L. Co.'s No. 3 Grisham-Hunter-A, NW cor. W half SE Sec. 41, Blk. B-5 ..... Top salt 1,150 ft.; fishing at 2,539 ft.

Texon O. & L. Co.'s No. 1 Grisham-Hunter-B, NW cor. W half SW Sec. 45, School Blk. 26 ..... 1½ bailers salt water hr. at 2,720 ft.; drlg. 2,863 ft.

Texon O. & L. Co.'s No. 2 Grisham-Hunter-B, NE W half SW Sec. 45, Blk. 26 ..... Shut down for storage 2,815 ft.; top pay 2,810 ft.; drlg. 2,924 ft. making 1,251 bbls.

White Eagle O. & R. Co.'s (was Gibson & Johnson's) No. 1 P. A. Lock, 1,320 ft. W of NE cor. Sec. 30, Blk. 74, NW of discovery well, elev. 2,830 ft. ..... Total depth 3,260 ft.; shut down; pulled 5 3-16-in. casing to run 6⅝-in. casing by tools.

Southern C. O. P. Co.'s No. 1 Ida Hendricks, 3-T-67-A, C SW NW NE Sec. 4, Blk. B-12, elev. 2,784 ft. ..... Top lime 2,638 ft.; slight show oil 3,000-08 ft.; filled up 1,500 ft. sulphur water at 3,065-72 ft.; plugged back to 3,050 ft.; water now shut off; shut down waiting orders.

Southern C. O. P. Co.'s No. 2 T-67-A, NE SE Sec. 42, Blk B-5 ..... Location.

Southern C. O. P. Co.'s No. 2 Ida Hendricks 2-T-67-A ... Drlg. 2,755 ft.

Southern C. O. P. Co.'s No. 1 Ida Hendrick, T-67-E, SE NE Sec. 42, Blk. B-5 ..... Location.

Southern C. O. P. Co.'s No. 2 T-67 Ida Hendricks-F ..... Top salt 1,715 ft.; cem. 6-in. 2,397 ft.; drlg. by tools 2,250 ft.

Southern C. O. P. Co.'s No. 3 T-67 Ida Hendricks-F ..... Top salt 1,702 ft.; top lime 2,630 ft.; fish. 2,912 ft.

Southern C. O. P. Co.'s No. 4 T-67 Ida Hendricks-F ..... Top salt 1,800 ft.; top lime 2,700 ft.; shut down 2,701 ft.

Southern C. O. P. Co.'s No. 5 T-67 Ida Hendricks-C .... Cem. 6-in. 2,643 ft.; shut down.

Southern C. O. P. Co.'s No. 2 T-67 Hendricks-B ..... Top salt 1,866 ft.; setting 6-in. 2,658 ft.

Southern C. O. P. Co.'s No. 1 T-67 Hendricks-3-B ..... Drlg. 2,094 ft.

Southern C. O. P. Co.'s No. 2 T. G. Hendricks, T-67-3B, NE SW SW Sec. 33, Blk. 26 ..... Drlg. 1,170 ft.

Southern C. O. P. Co.'s No. 2 Hendricks 3-T-68-A ..... Top lime 2,280 ft.; shut down 2,790 ft.; 50,000,000 ft. gas; tools out.

Southern C. O. P. Co.'s No. 3 Hendricks 3-T-68-A ..... First gas 2,400 ft.; 8,000,000 ft. gas 2,420 ft.; total depth 2,439 ft.; temp. aban.

Southern C. O. P. Co.'s No. 1 T-88 Ida Hendricks-C, NW cor. Sec. 28, Blk. B-5 ..... 6,000,000 ft. gas 2,665 ft.; total depth 2,880 ft.; drlg. by tools.

Southern C. O. P. Co.'s No. 4 Ida Hendricks, T-88-C .... Top salt 1,290 ft.; top lime 2,530 ft.; fishing 2,865 ft.

Southern C. O. P. Co.'s No. 5 Ida Hendricks, T-88-C .... Gas at 2,605 ft.; show oil 2,735 ft.; drlg. 2,770 ft.; show oil 2,845 ft.; top salt 1,190 ft.; top lime 2,457 ft.; drlg. 3,040 ft.; 300 bbls. daily.

Southern C. O. P. Co.'s No. 7 Ida Hendricks, T-88-C ... Show gas 2,600 ft.; top pay 2,811 ft.; drlg. 2,985 ft.; spraying oil; total depth 3,051 ft.; initial prod. 350 bbls. in 15 hrs.

Turman & Maxwell's No. 2 Ida Hendricks ..... 10,000,000 ft. gas 2,865 ft.; total depth 2,915 ft.; aver. 823 bbls. past week; drlg. 2,970 ft.

Turman & Maxwell's No. 4 Ida Hendricks ..... Top lime 2,355 ft.; drlg. 2,500 ft.

Turman & Maxwell's No. 5 Hendricks, SE cor. E half NE Sec. 29, Blk. B-5 ..... Cem. 2,565 ft.

Turman & Maxwell's No. 6 Hendricks, NW cor. E half NE Sec. 29, Blk. B-5 ..... Rigging up standard tools 2,400 ft.; top salt 1,217 ft.

Turman & Maxwell's No. 7 Hendricks ..... Top pay 2,720 ft.; total depth 2,860 ft.; temp. completed; 2,400 bbls.

Turman & Maxwell's No. 8 Hendricks ..... Top salt 1,260 ft.; cem. 6-in. 2,355 ft.; drlg. 2,400 ft.

Southern C. O. P. Co.'s No. 1 Ida Hendricks, T-88-G, SW SE Sec. 28, Blk. B-5 ..... Top lime 2,612 ft.; rigging up standard tools 2,613 ft.

Southern C. O. P. Co.'s No. 1 T-88 Hendricks-H ..... Top salt 1,290 ft.; top lime 2,600 ft.; bailing casing 2,717 ft.

Southern C. O. P. Co.'s No. 2 T-88 Hendricks-H ..... Top salt 1,232 ft.; total depth 2,700 ft.

Southern C. O. P. Co.'s No. 2 T-88 Hendricks-A ..... Drlg. 2,608 ft.

Southern C. O. P. Co.'s No. 1 Ida Hendricks, T-88-I, SE cor. E half NE Sec. 30, Blk. B-5 ..... Top lime 2,670 ft.; top salt 1,310 ft.; fishing 2,950 ft.

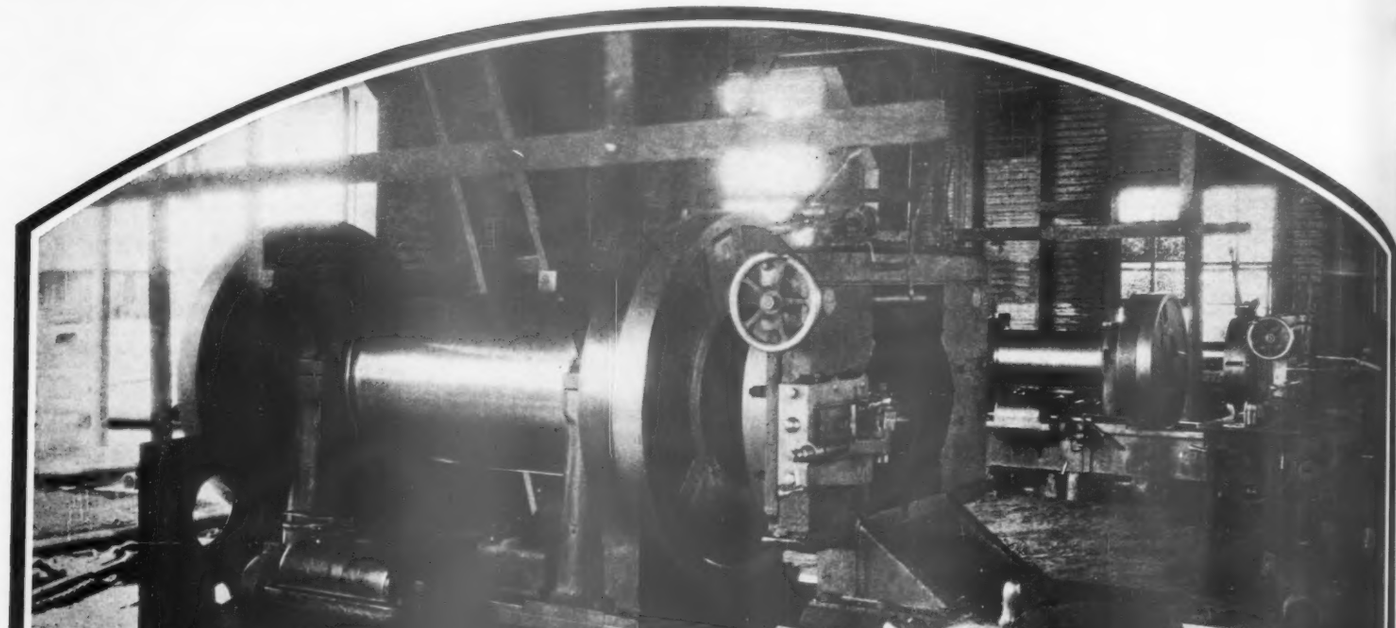
Southern C. O. P. Co.'s No. 1 E. G. Hutchings, T-90, NE cor. E half SE Sec. 47, Blk. 26, elev. 2,835 ft. ..... Top salt 935 ft.; top lime 2,346 ft.; total depth 2,484 ft.; gas blew out preventer.

Liano Oil Co.'s No. 1 F. B. Armstrong, at common cor. Secs. 12, 13, 18 and 19, Blk. B-6, School Land ..... Location.

Roxana Pet. Corp. and Liano Oil Co.'s No. 2 W. F. Scarborough, SW cor. NE Sec. 1, Blk. C-32, School Land ..... Drlg. 550 ft.; top salt 1,120 ft.; shut down 1,475 ft.

Not to take advantage of the scientific methods of drilling and cementing that caused the overproduction at Seminole is to pass up the very first step in true conservation. Oil can never be brought to the surface that is wasted underground. In the interest of our national petroleum resources, the methods used to prevent waste at Seminole should be extended to all the fields of the United States.

HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Okla.



Largest

This No. 20 Duplex machine has a hole 23½" in diameter through the arbor and die head, and will handle pipe and casing from 10" to 20" inclusive. It is said to be the largest in the Oklahoma oil fields and is located at Wewoka.

In the background may be seen a No. 12 Duplex with sliding die-head.

Both machines have skip tooth dies with curved eccentric relief for cutting long tapered threads at one pass.

Bignall & Keeler have concentrated for fifty years on pipe threading machines. Some of the first machines made are still in service.

Those who know specify B & K machines.

Bignall & Keeler Machine Works

of the N. O. Nelson Manufacturing Co.

Edwardsville, Illinois

PEERLESS B&K DUPLEX P.D.C.

O&GJ 2-22 Grav

PLAN FOR UNIT POOL OPERATION UNDER AUTHORITY OF THE STATE

By O. E. Kiessling*

Three years ago unit operation was entirely visionary, even in secondary recovery. Engineers dared not advance the idea publicly for fear of harming their reputations as practical operators. Yet today its existence is an actual fact in those few instances where some form of unification has been possible, and where the need for efficient secondary recovery encouraged its adoption. At least a part of the industry, waking from its self-complacement slumber, has felt a tremendous urge toward consolidation. Surely the universality of unit development for all pools seems idealistic, but it is not more so than was the dream of improved secondary recovery a few years back.

However, certain important difficulties which the present schemes have not satisfactorily met, will have to be overcome before this great advance is possible. There are many fields where the plan is desirable, but either lack of foresight or inability to harmonize the various property interests has prevented its introduction.

There has been no general agreement between the operators, owners and students of the problem as to how a consolidation might be equitably effected. Despite the practical makeshifts now used, the question of how to allocate the royalties so as to reconcile the equities of the various owners in the pool is still unanswered. From almost the beginning of the industry, some aribitrary ruling for the division of royalties has been utilized in order that business might continue. Group leasing, with the concomitant necessity for some method of allocation, brought this problem into the courts long before the advent of the unit idea. As far back as 1895, the legality of such a lease was established, the decision serving as a precedent in subsequent community lease disputes. In regard to the division of profits, the court said: "Each lessor was entitled to share equally in the royalty received, regardless of from what portion of the mine the rock was taken." The lease form known as "Mid-Continent 88" carries the following provision which has been enforced by the courts:

If the leased premises shall hereafter be owned in severalty or in separate tracts, the premises, nevertheless, shall be developed and operated as one lease and all royalties accruing hereunder shall be treated as an entirety and shall be divided among and paid to such separate owners in proportion that the acreage owned by each such separate owners bears to the leased acreage.

The legality of allocation on the basis of even such an arbitrary formula as the relation of the individual to the total acreage has been long upheld by the courts. Whether we could call the method "equitable" or not is a different question.

Allocation on Basis of Acreage

Most of the new voluntary consolidations have adopted the scheme of allocation on the basis of acreage. For example, in the Wellington Dome area the total acreage within the limiting contour of the pool constitutes the denominator of a fraction. The acreage of the individual owner is the numerator. The product obtained from multiplying the total royalty to be paid by this fraction is the amount of royalty due to the particular individual.

Such a procedure is readily understood and easily manipulated, but it has one serious defect as a guide for distribution: It does not account for the potentiality of a given property to produce oil. Forty acres on the dome of the structure, or in any other particularly favorable location, receives the same amount of royalty as the 40 acres on the flank where edge water and reduced gas pressure mean a lower yield. Owners of unlikely locations have everything to gain by an arrangement that disregards the potential capacity of a property to produce oil, while those in the producing areas receive a smaller proportion of the total yield than they would under competitive drilling. Admitting that such a manner of allotment may be inequitable in a sense, voluntary consolidations have been effected because it was understood that distribution would take place on the acreage basis. Those who have held oil-bearing properties have been glad to play this game of "grab-bag" under unit operation, for the "something" they drew was always more than would have been their share under the competitive system. They could not lose. As long as all get this "more," everybody is happy, even if the ratios of the individual to the total returns may be materially skewed.

Whenever there has been combination in new pools, the acreage scheme of dividing royalties has been used, not because the objection to the plan has not been recognized, but because no better method has been devised which will be accepted by the parties concerned. However, some attempt has been made to count productivity as a factor in determining distribution in those areas engaging in secondary development, perhaps because in these cases it is clearly evident to every one that when the earnings of two properties are pooled, the one that has shown the largest producing capacity previous to the consolidation should receive a larger portion of the joint yield.

Equitable Distribution of Royalty

No two methods for calculating to what extent this previous yield or the potential capacity of a property to produce oil shall determine allocation have been the same. The details of the various schemes have been governed by the willingness of owners to accept them, rather than by the equitableness of a particular arrangement. They have been tailored to fit. Properties of two consolidations in Oklahoma were appraised in proportion to the daily production of the wells prior to the application of air. In another instance, the properties have been appraised one-half in proportion to the daily production of oil and one-half in proportion to the number of active wells. A stock company was formed in the Delaware Extension Pool, and the stock was issued in proportion to the daily production prior to consolidation. Owners in the Woody Pool assigned their properties to a trustee, and expenses and profits are allocated in proportion to the amount of production and the number of wells producing. Production is allocated in proportion to the number of wells alone in a small pool near Nowata. A survey of these different methods for allotment in consolidations of old pools shows that the inherent difficulties still remain. Even if the question had been settled on the basis of previous yield for the areas engaging in secondary recovery, the method would still be inapplicable to new pools where production was not proved.

The key to a satisfactory plan of unit operation lies in working out a scheme for putting each owner on an equitable basis so that he will receive the amount of royalty to which he is entitled because of the nature of his property and the relationship it bears to the rest of the pool. This solution to the problem of equitable distribution to royalty owners must be found if unit operation is to be the future system of oil production. If individuals agree voluntarily to pool their interests on the basis of an acreage or a stock-sharing plan, as has been done, consequent losses or profits are the result of their business judgment and nothing more is done about it. But in approaching the entire industry with the proposition that the present system of competitive drilling be relegated in favor of co-operative action, we should be able to satisfy the producers and the public that the influence of guess and chance

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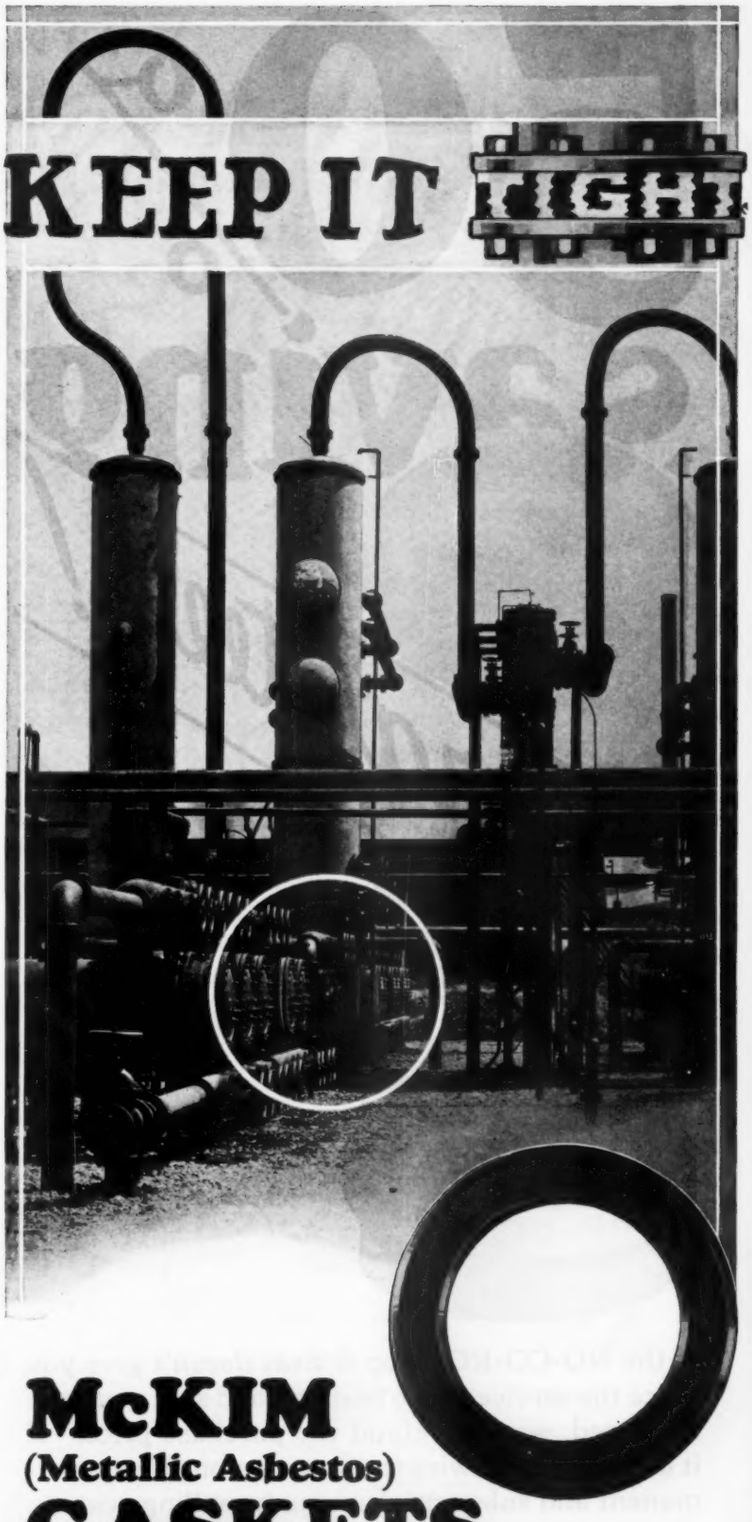

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has been largely minimized. An equitable scheme of allocation, laying down rules whereby two intelligent men starting with the same facts will arrive at essentially the same results, is necessary before unit operation can be applied generally.

Plan Presents Difficulties

The difficulties in devising an equitable plan for distribution among the landowners within the pool are such as to puzzle the geologist, confuse the economist, delight the lawyer and completely baffle the parties most intimately concerned. Delicate questions arise, such as: What is a fair equity? Are claims to rights valid under a legal principle which the rhetoric but not the action of the courts has repudiated? What weight can be given to geological opinion when irregular geophysical conditions are considered? These are merely a few of the choice plums picked for the nourishment of our mental processes. For example, let us consider the equity of a man who owns a portion of the dome area in a field such as Cushing, Teapot Dome, or Cromwell where a body of free gas occupies the upper parts of the oil sands. Under the old law, the gas would be allowed to blow, the pressure would be relieved, the oil would migrate into the depleted gas sand and the force needed to lift the oil to the surface in the oil horizon would be largely dissipated. Moreover, the oil drawn from the oil-bearing part of the sand was the recoverable portion, but most of it becomes unrecoverable as soon as it is taken up by the dry pores of the gas sand.

Efficient operation demands the capping of the gas well, and the question then raised is, "How much should the man who foregoes letting the gas blow off into the air receive of the total yield obtained on the other properties?" Also, "What general rule can be laid down for the determination of this amount?" A broad discussion of the different aspects of these problems is necessary, yet that alone is not enough, for the exigency of a practical situation awaits a verdict, and somewhere along the line of reasoning we must call a halt and point out that after passing judgment upon the evidence, a certain action seems proper. It is imperative, therefore, to offer a concrete plan which will provide equitable distribution, even though such a specific proposal be of a tentative nature.

Bases of Allotting Royalties

Assuming all of the owners in a pool form a corporation and lease the area to one or more operators, royalties should be allotted to the various individuals within the corporation upon two bases: 1) Distribution of one-third in proportion to the holdings of acreage. (2) Distribution of two-thirds in proportion to potential recoverable content of gas and oil as measured by the estimated volume of oil and gas sand within a property. (The ratio of "one-third" and "two-thirds" is suggested, but it should not be regarded as a dictum, and as being inflexible, provided practical application of the plan demonstrates the need for revision. Any other ratio which proves satisfactory is acceptable.) The first device has been described in the previous account of the Union Oil Co.'s operations in the Wellington Dome Field. Allocation under the second principle is determined in the same manner as under the acreage plan, except that volume of oil and gas sand is substituted for number of acres. The total royalty due to Farmer M can be expressed algebraically as follows:

$$\left(\frac{S}{A}\times\frac{R}{3}\right) + \left(\frac{T}{V}\times\frac{2R}{3}\right)$$

=Farmer M's royalty

R—Total royalty
A—Total acreage of pool
S—Acreage owned by Farmer M
V—Estimated volume of oil and gas sand in pool
T—Estimated volume of oil and gas sand under Farmer M's property.

After the unknowns have been supplied, this formula can be made the basis for a distribution of stock among the individuals within the owner's corporation.

The determination of the volume of oil and gas sands is purely an engineering problem. A series of test wells is necessary to delimit the producing portion of the pools and to serve as guides for future development. From a careful study of the cores obtained by these drillings, and from a thorough examination of the general structure, geologists can estimate this volume fairly accurately, "and the degree to which this volume may be recoverable can probably be estimated with considerable precision from the known laws of gas expansion; from experimental determination of the porosity, permeability and saturation of the cores of pay sand; and from tests of the fluidity of the contained oil. By checking results against each other, some conclusions as to the probability of error can be deduced, and these data will serve to make the estimates more precise. Of course no structure is theoretically perfect, but the exploration wells will indicate the most flagrant irregularities. Any variations in the sand itself, such as differences in structure, width and permeability should be carefully observed. Experts who are engaged for the task of estimation must be exceptionally well-informed, impartial and have a wide experience with the practical side of the producing industry.

Royalties allotted on the acreage basis can be paid from the first day of actual production; but a final settlement in regard to division of the other two-thirds cannot be made before a period of time has elapsed, depending on the progress of developmental drilling. In the interim, the problem could be met in various ways, of which the following is one suggestion. Test wells having delimited the field, a preliminary estimate of the volume of oil and gas-bearing sand can be made. From six months to a year later, depending on the progress in drilling, the first estimates are to be corrected and submitted as a basis for the payment of one-third of the royalty. The other third is to be held in escrow pending the final arrangement. Final estimates should be available after about another year of development, and they will become the basis for the distribution of both the stock and the accumulated royalty. (It has been suggested that a longer period, say four years, might be advisable in some cases in order to allow greater time for exploration.) The stock represents future claims on royalties, periodically partitioned, and can be sold and exchanged much as any other property, greatly simplifying the transfer of royalty interests by the individual owner.

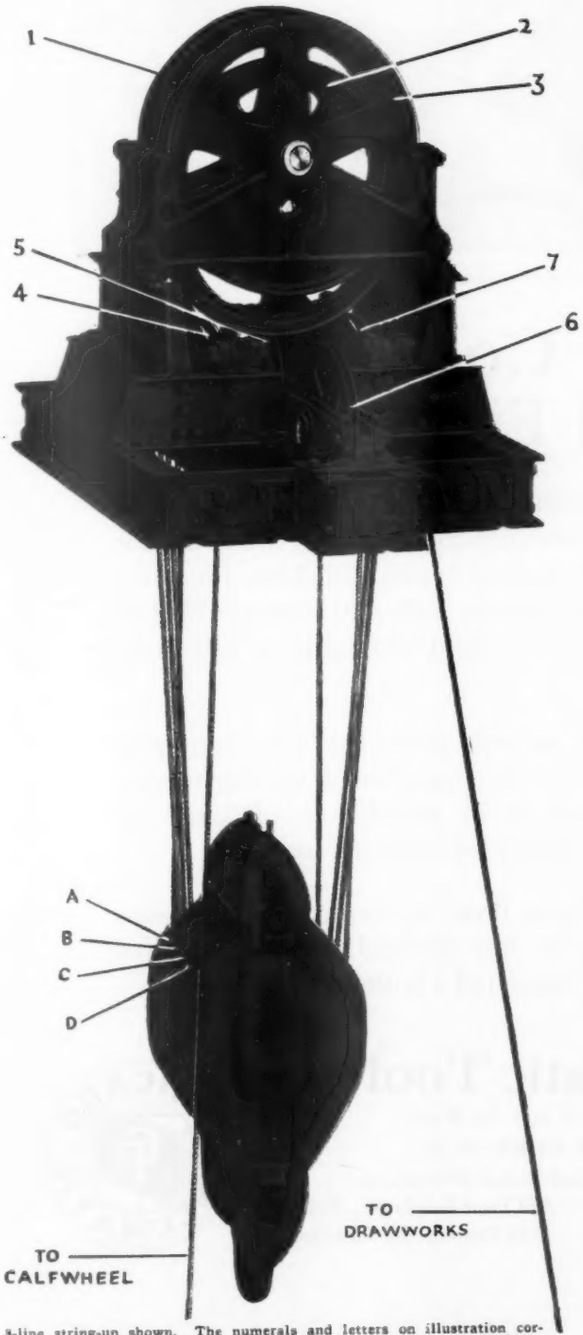
Larger Royalties

The percentage of the total production distributed to landowners can be determined only by bargaining between corporations—the owners and the operator. The mobile exploiter moves to the stationary oil fields as the bee moves to the flower. Operating companies would offer the most favorable terms possible to secure the contract. Larger royalties would accrue to the owners because of the greater economies possible through consolidated operation, the keen competition between operators for the privilege of development, and because more can be paid for the privilege of developing a large tract than for a small one. For example, in the leasing of Osage lands, some operators offered a one-sixth royalty for the privilege of developing a large area rather than the customary one-eighth in that field. If a one-eigth royalty is fair under present conditions, the great advantages of unit operation should make possible a higher percentage. Operating overhead charges can be spread over a much longer period because of the longer life of the pool, making the position of the operator more stable. Also, the increased yield is an important factor, since five-eighths of the total production under pool development may be more than seven-eighths of the production under competitive drilling with its vexing obligation of drilling offset wells. Bargaining between corporations introduces an element of flexibility into the scheme, for the different sets of conditions existing in the various fields will materially affect the results.

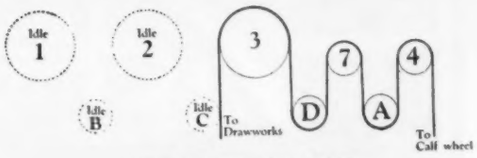
Complete development of an entire pool by a single company would mean a large

Feature No. 11

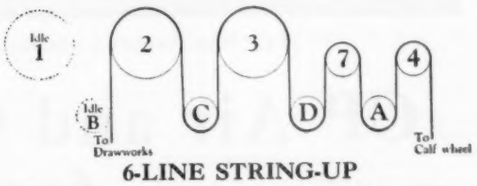
Convertible to 4, 6, 8, & 10 lines Regan Crown Block



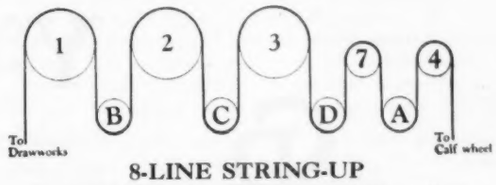
8-line string-up shown. The numerals and letters on illustration correspond with those in drawings of circles. Two extra sheaves (5-6) are used in each string-up. Sheave (6) of the Crown Block is the Sand Line sheave, while the opposite sheave (5) is the Crown sheave generally used for the Cat Line.



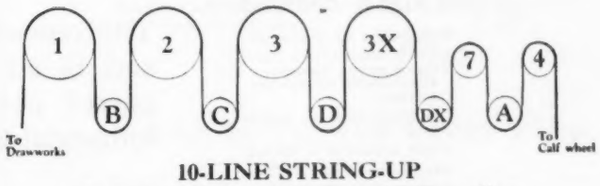
4-LINE STRING-UP
Stringing 3 Crown Block and 2 Traveling Block Sheaves.



6-LINE STRING-UP
Stringing 4 Crown Block and 3 Traveling Block Sheaves.



8-LINE STRING-UP
Stringing 5 Crown Block and 4 Traveling Block Sheaves.



10-LINE STRING-UP
Stringing 6 Crown Block and 5 Traveling Block Sheaves.

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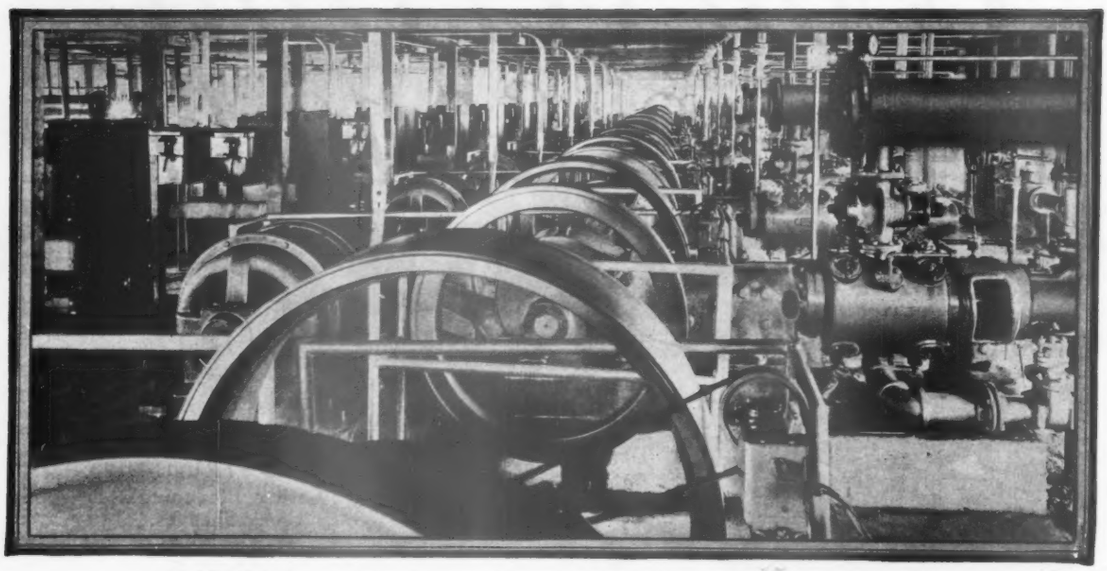

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A wider introduction of "sliding scale" clauses into leases is desirable. Under the sliding scale, royalties are reduced as production decreases. Unusual production should enable the operator to pay a higher percentage. A provision for graduated royalties has been included in the government leases on the public domain for a number of years. Small producers pay low percentages, the rate progressing up to 33⅓ per cent for 500-bbl. wells, and even higher for greater volume. The average royalty paid in the Salt Creek Field has been around 22 per cent and from one exceptionally rich strike our Government is today receiving a royalty of 65 per cent. Such provisions, when properly formulated, are in the interest of both operator and owner. High ratios of royalty in case of bonanzas are no burden to operators. Low percentages with low production facilitate longer continuous production. The owner suffers no real loss in this case since he is paid over a longer period of time, but in smaller amounts, whereas his insistence on the usual amount would have cut operations short. "There may come a time in the production of wells in which one-eighth or one-sixth royalty, such as obtains in the Osage, or one-fifth in certain cases, would force the operator to shut down the wells rather than pay the royalty."

A hypothetical situation, where the owners form a corporation and lease to one operator, was employed in explaining the mechanics of the proposed method of allocation and determination of royalties, and this illustration should be kept in mind while discussing the equitableness of the plan. (In the argument, the owners' rights to their property are assumed to be unincumbered for the purpose of lucid explanation. Under ordinary conditions this would be the exception, for the complication of property rights resulting from leasing, subleasing, and from special forms of contract is amazing.)

All Within Contour Must Co-operate

All owners within the limiting contour, which the best geological advice indicates is the producing limits of the pool, are included in the unit organization. Should an owner have a tract of land that straddles this arbitrary boundary, that part within the contour will be governed by the provisions of the co-operative agreement. The inclusion of all within the area is absolutely essential to the idea of unit operation, of emptying the underground reservoirs as one big engineering undertaking. The man on the flank may have a slim prospect of production, but he has a prospect just the same and must receive payment for his part in making unit development possible. Such a prospect has a market value, and to deprive the marginal individual of the right to sell or lease the oil rights to his property without remuneration is a clear case of deprivation. One-third of the royalties has been suggested as adequate remuneration for contribution of acreage, yet this should not be regarded as an inflexible ratio and practical application may demonstrate that it is excessive or vice versa. Therefore, an owner on the flank of the structure, whose land is inside the area of potential production, but which later proves outside the area of actual production, would continue to receive a percentage of the royalties[1]. Such payment does not disturb the equities of others in the enterprise since it would amount to only a small part of the extra production and great economies which the pooling of holdings makes possible. While the areas which later prove to be completely or semidry must be remunerated, their reward is far from being the same as that received by the productive sections, and the extra profits which result from their inclusion mean greater total profits for all. No owner incurs any deprivation or loss, and all obtain gains through co-operative action. In this sense, unit development more than "pays its way."

The equities of owners are further reconciled by a distribution of two-thirds of the royalties on the basis of computed original content of recoverable oil as measured by the volume of oil and gas sands underlying their properties. Gas and oil sands are rated on an equal basis because of the tremendous importance of gas for efficient recovery. Payment of royalty for gas is no innovation. Rush Greenslade, in his paper on Oil and Gas Leases, made the statement that "practically all modern leases provide for the payment of a royalty on gas from an oil well." Expanding this idea to apply to the payment for use of gas from capped wells, it can be considered that the royalty is compensation for gas from potential oil wells since the usual practice of "blowing" the gas would make them producers. If the gas well is capped for reasons of efficient operation, failure to remunerate the owner would be a serious interference with his rights, for under the old law he was allowed to let the well "blow," and the oil which migrated into the gas sands brought in a return. Moreover, the point has previously been made that, in this migration, the oil drawn from the oil-bearing part of the sand was the recoverable portion, and that most of it becomes the unrecoverable portion as soon as it is taken up by the dry pores of the gas sands. The increase in total recovery due to conservation of gas is more than sufficient to remunerate the owners of gas-bearing areas. This economy works both ways, for the oil sands produce so much more with the aid of the gas, that, counting in the charges for gas pressures, the owners of oil strata still have a large surplus which they would not have received otherwise.

Potential Yield Most Equitable Basis

Potential yield is a more equitable basis for determining distribution than actual yield. Assume, for example, that we have a perfect pie-shaped pool, with regular sands throughout carrying the same amount of oil, and a gas-bearing area occupying the geometrical center. It is an engineering fact that if this pool were quartered and one section first developed, the other sections would tend to produce less than the first. The simultaneous development of the whole is physically impossible, hence actual yield, even in unit development, would not be a fair basis for allocating returns. (Recalling an analogy between the barrel of cider and an oil pool, it is evident that the pool can be drained by a number of different wells. Because the operating company can do its job most cheaply and efficently by staying within certain sections is no reason for penalizing the holders of other areas, provided they, too, have potential sources.) In this illustration each owner had the same potential producing power, but since some part of the pool had to be developed first, there was disparity in yield. Moreover, while it is possible to determine with reasonable accuracy the extent of the source of the oil, geologists cannot ordinarily

[1]It should be clearly seen that there are other ways in which edge acreage might be considered under this plan. For example, the weight of opinion might be in favor of eliminating royalties to acreages which are proved nonproductive through final exploration. And it is argued with considerable force that all a man can reasonably expect is a fair and adequate test of his property, and if his holdings are nonproductive, the sharing in the royalties on an acreage basis during the period of exploration constitutes adequate remuneration. Under such a scheme, payment of royalties would proceed as follows:

A. Owners of acreage, pooled but outside of the productive territory as shown by drilling, participate on an acreage basis for two years—or until disproof of productivity through drilling.

B. Owners of other acreage participate on acreage basis for four years (long-time test period), and on the basis of proportionate share of original oil and gas content of properties for the period after four years. A reasonably sound appraisal can be made after this time has elapsed, and separate appraisals can be made and averaged, if desired.

However, such a change in the proposed plan of allocation is merely one of detail, and it would not demand any great modification of the principles suggested in the main argument.

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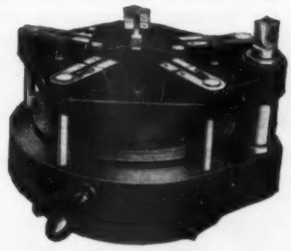

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determine from what part of the sand a well's production is obtained. Potential productivity seems to be the only fair basis for allotment.

In advocating this method, the ordinary disparity in production between upper and lower wells—those on the flank and those in the center of the structure—has not been overlooked. Practical oil men entertain the notion that top wells are the greatest producers, and under competitive drilling this has generally been true. The reason for this greater production is that the top wells have been drilled first, and not because they reached exceptionally productive sands. The petroleum which migrates up the inclined strata becomes the source of production for the wells higher up, saturates the central sands and enables the top wells to produce more than those lower on the structure. That there has been such a difference might tempt a proposal of progressive exclusion of edge acreage as water encroachment takes place. Under unit operation, however, the top well may not prove to be the best producer in the pool, although the increased gas pressure at this point has meant a high yield in the past, for efficient operation may demand the capping of this well. Moreover, edge acreage should not be progressively excluded, for, although operations on the upper properties tend to drain the outer sections, the right to share continuously in the total royalties is really compensation to the owner of lower sands for drainage. Since, under any scheme of efficient operation, the wells are located with a view of obtaining the maximum recovery of oil from the underground structure rather than out of any special considerations for surface boundary lines, potential yield is clearly a more equitable basis for determining distribution than actual yield. The idea of ownership in oil because of its reduction to possession has been a failure both legally and economically, and the solution of the problem lies in obtaining continuously for each owner that ratio of the return from unit operation which is represented by the relationship of his holdings to the resources of the pool.

Suggested State Action

The authority of the state to prescribe regulative laws preventing waste is clearly established. The owners on a likely structure shall first submit a petition for their organization into a corporate enterprise to the county board or local court. This document shall be signed by the majority of owners with respect to numbers and acreage held within the prospective pool, and shall contain a preliminary description of boundaries and purpose. At the following hearings, petitions for inclusion and exclusion of holders shall be heard, but the problem of determining boundaries is not a simple consideration of mere units of land. All within the limiting contour, as that line is drawn by the state geologist, shall be included in the prospective organization. A final report, then, shall be submitted to the owners for acceptance or rejection. In order that the project be legally in existence, 60 per cent of the owners on the basis of numbers and acreage shall vote "Unit Development, Yes." Only those holding acreage or lease rights in the delimited area shall be allowed to vote, and all shall be canvassed and reported as "Yes," "No," or "Not Voting."

Once the project is in existence, defined responsibility for carrying on the corporation business is needed. A board of directors shall represent the will of the owners. Questions of great imporatnce can be submitted in referendum to the membership. Members shall vote in proportion to their acreage up to the time of final determination of allocation, after which votes shall be cast in proportion to the shares of stock held.

An important ex-officio member of every board shall be the representative of the state geologist, an impartial outsider, whose calculations shall become the basis for final settlement of allocation. This report shall be signed by, and regarded as the report of, the state geologist, and it must be free from local bias and self-interest. Legitimate costs for this service can be charged against the gross returns of the pool. Owners who feel that their rights are being infringed in any manner shall be allowed to carry their appeal to the state courts.

The state shall provide that all new pools be developed in accord with the unit plan. No action can be taken in regard to areas already under development, but they shall be allowed to enjoy state cooperation provided they comply with the prescribed arrangements. The tremendous advantages of unit operation in secondary recovery will undoubtedly attract the owners of many of these areas into the fold. The state lays down these rules for the benefit of the operator, the owner and the public, and leaves to the corporation the organization of enterprise, the reward of profits, the distribution of the product, and the determination of the rate of production.

As an adjunct to the plan so far promulgated, some provision should be made for the remuneration of new discoveries. Unit operation prevents the wildcatter from reaping his usual benefit, of getting as much from the discovery claim or lease as possible. Wildcatting, or drilling where there is no proved production, has been responsible for a great number of discoveries, but this is inadequate evidence that these discoveries would not have been made anyhow. Oil has been such a bonanza that many have been willing to stake everything on a "chance shot." Consequently the wildcatters have moved so rapidly ahead of the big operating companies that only recently pressure has been exerted to see what another sort of prospecting would bring forth. As long as someone else was bearing the risk, the large companies stood at one side until something tangible developed. Wildcatters have often taken unwise and unnecessary chances, estimates showing that more than 85 per cent of the wildcat wells drilled in the United States are failures. Because of the extent to which our visible structure has been drilled, a larger proportion of wildcat holes will probably be dry. Sometimes new discoveries have been inopportune, the flush production demoralizing market demand and price. Today the wildcatter is not essential to the work of discovery, for the better operating companies have their scouting and geological departments and can take over the finding of new pools when pressed to do so.

Provisions to Govern Prospectors

However, since unit development eliminates the old method of rewarding discovery, other compensation must be provided if there is to be any incentive for further exploration. Requiring a prospector to lease a whole structure is unwise, for it would merely increase the cost of putting down the first hole. In order to fit petroleum prospectors into our scheme, they should be licensed by the state government and must act in accordance with certain provisions:

(1) Their purpose is to be solely that of discovery, not operation. After deciding to explore a particularly favorable structure, the prospector files with the state office a map of the area and a statement of intentions.

A. One prospector only on a single structure.

a. Others cannot encroach as long as work is actively carried on.

b. After a given period the prospector must drill or vacate the structure.

(2) As a reward for discovery, the prospector is entitled to a percentage of the gross yield (constitutes a prior lien). While it is not clear what this percentage should be, prospecting would still retain a large element of chance, for the reward varies with the size of the gross yield.

(3) Oil obtained from a well is the only accepted evidence of discovery.

(4) Prospecting companies may be employed by the owners' corporation to explore and delimit a pool, all wells being capped pending unit operation.

(5) Prospecting companies may be subsidiaries of operating companies which submit bids to the owners for thhe privilege of development.

These provisions supply the incentive by guaranteeing rewards in event of discovery. A wide field is thrown open to the fossicker for oil.

THE COST

THERE'S a heap-o'-difference between the cost of Jars and Jar costs. To properly figure Jar costs you must consider service rendered, cartage charges, joint break-ins, delays, possible fishing losses, the safety factor, etc.

Are you using SPANG WELDLESS JARS and thus, obtaining Jars at the minimum cost?

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SPANG AND COMPANY

BUTLER, PENNA.

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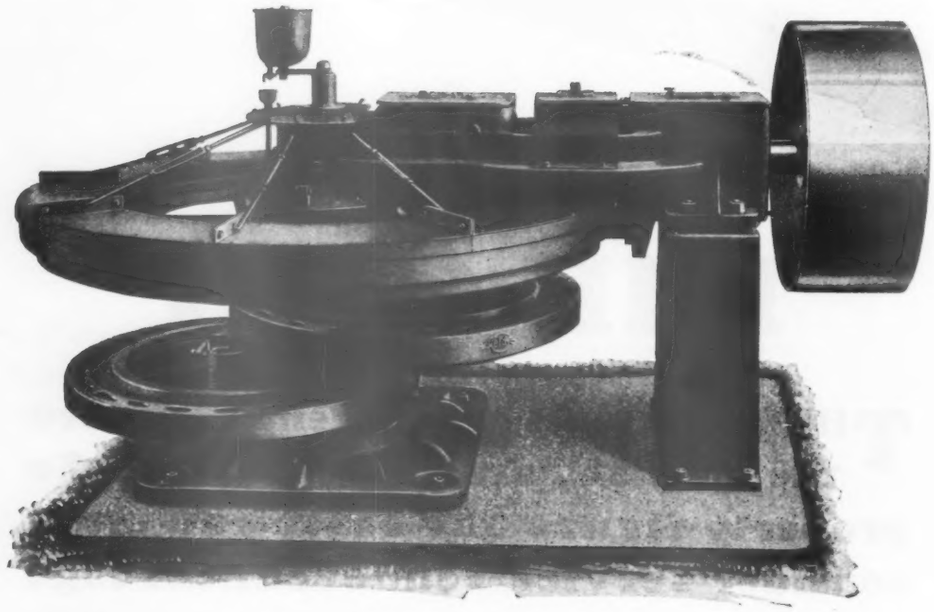

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GAS ENGINES—OIL ENGINES—PUMPING POWERS
LOOK BOXES—MANIFOLDS

WILDCAT OPERATIONS IN OKLAHOMA

(Continued from Page 42)

25-15w ..... Hole full water 775-800 ft., shut down 900 ft.
McCray Oil & Gas Co.'s No. 1 Whitney, NE cor. NW SE Sec. 19-24-14w ..... Shut down 1,880 ft.

KAY COUNTY

Boucher and others' No. 1 Cooper, SE cor. SE Sec. 23-27-2w ..... U.R. casing 1,350 ft.
Ponca Lee Oil's No. 1 McNeil, NW cor. NE Sec. 32-26-2e.. Shut down 2,795 ft.
Tonkawa Development Co.'s No. 1 McDaniels, SE cor. SE Sec. 15-25-1w ..... 500,000 ft. gas; 3,980-88 ft.; shut down, 4,475 ft.
Miller & Geyer's No. 1 Albright, NW cor. SE Sec. 10-25-1 ..... Drilling 4,064 ft.
Corley and others' No. 1 Williams, SE cor. NE SW Sec. 7-21-1w ..... Shut down for casing 1,920 ft.

WOODWARD COUNTY

Otstot Development Co.'s No. 1 Simmons, SE cor. SE Sec. 32-24-17w ..... Shut down for pipe 1,490 ft.
Wight & Wahl's No. 1 Williams, C NW Sec. 16-23-20w... Rig.
Randau & Mooney's No. 1 Parker, SE cor. NE NW Sec. 4-23-16w ..... Shut down 1,092 ft.
Sharon Oil Co.'s No. 1 Elmore, SW cor. SW Sec. 25-21-21w ..... Shut down 2,772 ft.
Burgoyne Brothers' No. 1 Barnes, SW cor. SE NE Sec. 16-21-19w ..... Drilling 600 ft.

GARFIELD COUNTY

E. L. Love and others' No. 1 White, SE cor. NW Sec. 9-24-6w ..... Hole full water 4,650 ft., shut down 4,720 ft.
Failing and others' No. 1 Gorsuch, SE cor. SE Sec. 14-24-3w ..... Drilling 4,235 ft.
Fleming and others' No. 1 Wengert, NW cor. NW Sec. 3-22-5w ..... Shut down 750 ft.
Beopple and others' No. 1 Schweer, C SW NE Sec. 12-21-4w ..... Shut down 1,850 ft.
Marland and Barnsdall's No. 1 Looman, NE SE Sec. 9-20-4w ..... Fishing 5,740 ft.
Marland Oil Co.'s No. 1 Miller, SW cor. SW Sec. 12-20-4w Shut down 4,586 ft., waiting on test Sec. 9-20-4w.

ELLIS COUNTY

Oklahoma Northern's No. 1 Young, NW cor. NW Sec. 9-21-25w ..... Fishing 300 ft.

NOBLE COUNTY

Barnsdall Oil Co.'s No. 1 Bumberger, NE cor. NW SE Sec. 11-21-1 ..... Cellar.

KINGFISHER COUNTY

Slick & Harrington's No. 1 Cromer, SE cor. NE NE Sec. 25-19-5w ..... Location.
H. H. Morgan's No. 1 Buscon, SW cor. SE NE Sec. 30-16-9w ..... Shut down 1,610 ft.
Petroleum Research Core Drill Corp.'s No. 1 Wolff, NW SE Sec. 6-16-7w ..... Shut down 800 ft., litigation; may start soon. Moved out all but rig.
McKinney & Crawford's No. 1 Sturgeon, NE cor. SW Section 27-16-6w ..... Drilling 3,804 ft.
Wiley & Manahan's No. 1 Johnson, C NW Sec. 26-16-5w... Fishing 4,326 ft.
Reiter-Foster Oil Co.'s No. 1 Unknown, SW cor. SE Sec. 23-15-5w ..... Rig.

LOGAN COUNTY

Champlin Refining Co.'s No. 1 Clark, SE cor. SW Sec. 8-19-4w ..... Drilling 4,754 ft.
Roxana Petroleum Corp.'s No. 1 Freelove, SW cor. SW Sec. 17-19-4w ..... 100 bbls. oil 6,128-6,132 ft.; drilling.
Sinclair Oil & Gas Co.'s No. 1 Webber, SE cor. SE Sec. 18-19-4w ..... Drilling 4,920 ft.
Twin State Oil Co.'s No. 1 Shaffer, NW cor. NW Sec. 20-19-4w ..... Drilling 4,610 ft.
Huckaby & McCoy's No. 1 Perfect, NE cor. NE Sec. 9-18-15w ..... Shut down 3,370 ft.
Haley & Smith's No. 1 Guier, SE cor. SW Sec. 33-18-3w... cleaning out 3,690 ft
Garber & Pulse's No. 1 Widdoes, NE cor. SE NW Sec. 32-18-3w ..... Shut down 1,200 ft.
T. B. Slick's No. 1 Bryan, SW cor. SE Sec. 28-17-1..... Drilling 5,460 ft.
Willis and others' No. 1 Sweezy, SW cor. NW SE Sec. 20-17-2 ..... Shut down 4,677 ft.
W. R. Ramsey's No. 1 McMillan, NW SW Sec. 24-16-3w... Hole full water 4,507-4,517 ft., shut down for orders.
Bu-Vi-Bar's No. 1 Kirkpatrick, NE SW SW Sec. 12-15-1w. Shut down 4,504 ft.

BLAINE COUNTY

Lowen and others' No. 1 Unknown, NW cor. SW NW Sec. 27-16-11w ..... Spudded and shut down.

MUSKOGEE COUNTY

Finefield and others' No. 1 Jobe, NE cor. NW SE Sec. 12-15-18 ..... Sand 1,100-10 ft., dry, shut down 1,252 ft. in lime at contract depth.
J. A. Evans' No. 1 Thompson, SW cor. NW SW Sec. 2-14-19 ..... Drilling 489 ft.
Elk Drilling Co.'s No. 1 Jones, SW cor. SW Sec. 34-13-17 ..... Spudded and shut down.
Sioux Oil Co.'s No. 1 Bradshaw, CEL NW NE Sec. 24-13-18 ..... Straightreaming 831 ft.
L. T. Haney's No. 1 Mitchell, SE cor. NW SE Sec. 33-13-18 ..... Drilling 1,630 ft., show oil and gas.
Rolestone and others' No. 1 Hixon, CNL SE NE Sec. 1-13-19 ..... Drilling 1,135 ft.

OKLAHOMA COUNTY

Cromwell Oil & Gas Co.'s No. 1 Proctor, C SE Sec. 21-14-3w ..... Shut down 400 ft.
Slick & Bailey's No. 1 Koester, C SE NE Sec. 18-13-3w... Rigging up standard tools and shut down 3,500 ft.
Cromwell & Franklin's No. 1 Thompson, SW cor. NE NE Sec. 15-12-3w ..... Drilling out cement 6,820 ft.
Cromwell & Franklin's No. 1 Gross, SW cor. NE SW Sec. 22-10-2w ..... Shut down 4,702 ft.

CREEK COUNTY

Lima Oil & Gas Co.'s No. 1 Grayson, NW cor. NE NE Sec. 11-14-7 ..... Cleaning out 3,250 ft.

CANADIAN COUNTY

T. B. Slick and others' No. 1 Pazowrech, NW SE Sec. 29-13-5w ..... Hole full water 4,338-4,452 ft., shut down 4,580 ft.
Ramsey Brothers' No. 1 Newman, CSL NE Sec. 9-11-7w... Drilling 4,100 ft.

LINCOLN COUNTY

Bu-Vi-Bar Petroleum Co.'s No. 1 School Land, C NE SE Sec. 16-13-4 ..... Shut down 4,500 ft.

OKFUSKEE COUNTY

Barnsdall Oil Co.'s No. 1 Self, SW cor. SE NE Sec. 21-13-9 ..... Drilling 3,755 ft.
Prairie Oil & Gas Co.'s No. 1 Gray, SW cor. SW Sec. 19-11-7 ..... Drilling 4,365 ft.
Moose & Daniels' No. 1 Stidham, SW cor. NW Sec. 4-11-10 ..... Shut down 622 ft.

SEQUOYAH COUNTY

Hunt and others' No. 1 Unknown, SE cor. NW SW Sec. 12-12-23 ..... Rigging up.
Citizens Gas Co., No. 1 Greenstreet, SW cor. NE SE Sec. 33-12-27 ..... Rig.

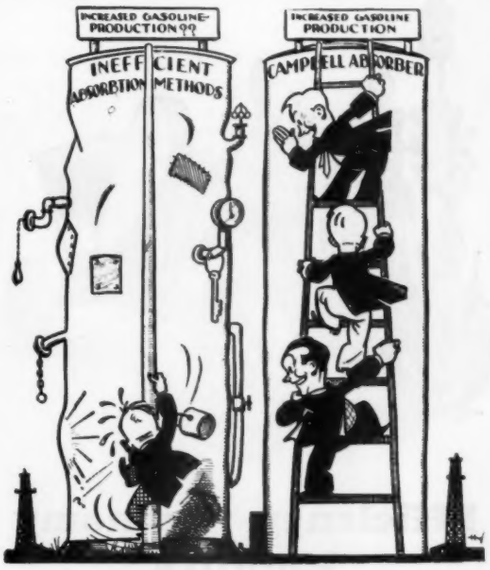
POTTAWATOMIE COUNTY

H. F. Wilcox Oil & Gas Co.'s No. 1 Pickard, SE cor. SW Sec. 32-11-2 ..... Shut down 4,500 ft.
Shaffer-Kilgore-Sykes' No. 1 Ives, C SE SE Sec. 12-10-3 ..... Underreaming 4,744 ft.
Prairie Oil & Gas Co.'s No. 1 Lumbley, SW NW SE Sec. 1-10-5 ..... Drilling 4,610 ft.
Central Commercial Oil Co.'s No. 1 McCrain, NW cor. NE SW Sec. 16-10-5 ..... Drilling 4,730 ft.
Superior Oil Co.'s No. 1 Herminghausen, SW cor. NW NE Sec. 24-8-3 ..... Cleaning out 4,110 ft.
Davy & Detrick's No. 1 McGehee, SW SE NW Sec. 10-6-2 ..... Shut down 4,998 ft.

CADDO COUNTY

Magnolia Petroleum Co.'s No. 1 Shelby, SW cor. SW Sec. 28-10-12w ..... Drilling 1,620 ft.
J. V. Bailey's No. 1 Hubbard, C NE NW Sec. 1-10-6w.... Shut down 150 ft.
W. J. Hartley's No. 1 Galbreath, SE cor. NW SE Sec. 29-5-12w ..... Shut down 3,294 ft.

Billions of Bubbles



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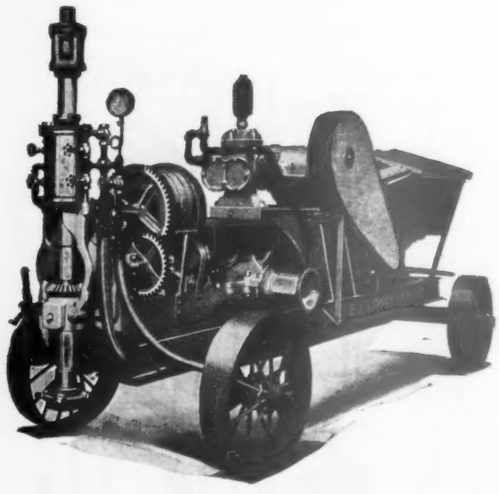


Efficiency Economy Mobility

THE diamond drill for your wild-catting and structure drilling must be efficient and capable of drilling every formation you will encounter. It must be economical in its consumption of fuel and water. It should be so mounted that it can be moved from hole to hole without loss of time.

The Longyear mounted hook-up fulfills each of these requirements. It is a 2N gas operated drill with a capacity of 1,000 feet of 2-inch core or 2,000 feet of 1⅛-inch core mounted with pump and Fordson gas engine on a steel truck ready for drilling.

The drill does not have to be dismounted when in operation and the use of the gas engine does away with the necessity of setting up a boiler and making the necessary pipe connections.

The gas engine, too, is a valuable feature in regions where steam fuel is scarce and expensive or where water would otherwise have to be trucked long distances.

E. J. Longyear Company manufactures other types of drills with either gas or steam power and fitted for every drilling purpose. For any information regarding them write our Minneapolis office or our branch warehouse, Ponca City, Oklahoma.

Other Longyear activities include contract diamond drilling, shaft sinking and mine development.

E. J. Longyear Company
Minneapolis, Minnesota, U.S.A.

SEMINOLE COUNTY

Roxana and Barnsdall's No. 1 Stidham, NW cor. NE Sec. 6-10-7 ..... Location.
Prairie Oil & Gas Co.'s No. 1 Davis, NE SE Sec. 21-10-7.. Rig.
Prairie Oil & Gas Co.'s No. 1 Varnum, NW cor. SW SW Sec. 5-9-6 ..... Drilling 3,745 ft.
The Texas Company's No. 1 Reed, SW cor. SW Sec. 12-8-5 ..... Drilling 3,963 ft.
Twin State Oil Co.'s No. 1 Walker, NE cor. NE Sec. 5-7-6 ..... Rig on ground.
Simon & Bean's No. 1 Palmer, SE cor. NW NE Sec. 7-7-6 ..... Rigged up and shut down.
Reiter-Foster Oil Co.'s No. 1 Coat, SW cor. NW SW Sec. 14-7-6 ..... Location.
Indian Territory Illuminating Oil Co.'s No. 1 Marshall, NW NW SW Sec. 32-7-7 ..... Fishing 4,759 ft.
McCullough Oil Co.'s No. 1 Powell, NW cor. NW Sec. 11-6-5 ..... Abandoned.
Magnolia Petroleum Co.'s No. 1 Vierson, SE SE NW Sec. 5-6-7 ..... Cleaning out 3,370 ft.
The Texas Company's No. 1 Reed, NE cor. NW NE Sec. 24-6-7 ..... Location.
Gardner Petroleum Co.'s No. 1 Unknown, NW cor. SE Sec. 36-6-7 ..... Drilling 2,588 ft.

BECKHAM COUNTY

C. & H. Petroleum Co.'s No. 1 Barnes, SW cor. NW NE Sec. 32-9-22w ..... Shut down 3,000 ft.
Pferffel and others' No. 1-A Carter, NE cor. NE Sec. 35-9-22w ..... Shut down 300 ft.

GRADY COUNTY

Remington and others' No. 1 Fryrear, SW SW NE Sec. 13-9-5w ..... Shut down 720 ft.; may start up soon.
Bedner and others' No. 1 Willis, C SW NW Sec. 12-7-5w ..... Shut down 2,450 ft.
Nichlos & Page's No. 1 Drake, SE NE SE Sec. 7-5-7-w.... Shut down 1,900 ft.

M'INTOSH COUNTY

Marlone Oil Co.'s No. 1 Sanders, NW cor. NE SW Sec. 10-9-18 ..... Shut down 2,250 ft.

M'CLAIN COUNTY

Daniels & LeWright's No. 1 Vandever, C SW Sec. 15-7-1w ..... Rig and tools.

KIOWA COUNTY

A. C. Varner and others' No. 1 Bonham, CSL NW NW Sec. 5-6-18w ..... Shut down 1,127 ft.

PONTOTOC COUNTY

Gillespie & Gant's No. 1 Taylor, SW SW SE Sec. 12-5-4... Sand 2,818-52 ft., water; plugged back 2,670 ft. shot 80 and 30 quarts; swabbed 29 bbls.; shut down.
T. B. Slick's No. 1 Barnett, NE SE NW Sec. 13-5-6..... Shut down 3,245 ft.
Sinclair Oil & Gas Co.'s No. 1 McDaniel, NE cor. NE Sec. 17-5-6 ..... Drilling 3,418 ft.
Mid-Continent Petroleum Corp.'s No. 1 Unknown, SE NE NE Sec. 14-5-7 ..... Location.
T. B. Whitney and others' No. 1 Moore, SE SW Sec. 17-5-9 ..... Drilling 700 ft.
Winkler and others' No. 1 Tiner, C SW SE Sec. 31-5-9.. Shut down 2,761 ft.
Dixie Oil Co.'s No. 1 Perkins, SE NW Sec. 15-4-1..... Drilling 4,480 ft.
R. F. Garland's No. 1 Strickland, SW NW SW Sec. 16-4-3 ..... Reaming 2,650 ft.
Marland Oil Co.'s No. 1 Lawrence, C SW SE Sec. 10-4-4.. Drilling 1,305 ft.
C. J. Shervin and others' No. 1 Wright, NW NE NE Sec. 13-4-6 ..... Shut down 1,925 ft.
Boles and others' No. 1 Rayburn, SW SE Sec. 35-4-6..... Shut down 1,340 ft.
J. E. Crosbie's No. 1 Nowabbi, SE NE SW Sec. 8-4-7.... Rigging up rotary.
Henry and others' No. 1 Gregg, SW SE NW Sec. 14-4-7... Shut down 1,090 ft.
Jolly-Ogg Oil Co.'s No. 1 Neeley, SE NE Sec. 24-3-10w... Drilling 996 ft.

GARVIN COUNTY

Magnolia Petroleum Co.'s No. 1 Vaughn, NW SW NW Sec. 12-3-1 ..... Drilling 4,680 ft.
Heath & Bauman's No. 1 Hatteil, SW SE SW Sec. 10-3-3 ..... Shut down 1,640 ft.

COMANCHE COUNTY

Danciger & Ellis' No. 1 Spitler, NE cor. SE Sec. 10-2-10w. Abandoned 2,203 ft.
Ashcraft and others' No. 1 School Land, SE cor. SE Sec. 20-2-10w ..... Broken sandy lime 823-954 ft.; swabbed 3 bbls.; total depth 978 ft.; shut down; material moved out.
Jenkins and others' No. 1 Smith, SW cor. SE SE Sec. 34-1-10w ..... Shut down 1,530 ft.

COAL COUNTY

Green and others' No. 1 Wilson, C NE SW Sec. 14-1-12w.. Shut down 3,210 ft.; show gas.
Revels & Magee's No. 1 Labor, NW cor. NW Sec. 17-1-2... Shut down 240 ft.
McGraw and others' No. 1 Patton, SW SE NE Sec. 35-1-8 ..... Shut down 973 ft.
Indian Territory Illuminating Oil Co.'s No. 1 Harris, SW cor. NW Sec. 10-1-11 ..... Fishing 1,630 ft.

OKLAHOMA PANHANDLE
CIMARRON COUNTY

Phillips and others' No. 1 Unknown, NW cor. NW Sec. 24-6-2 ..... Drilling 4,215 ft.
Sinclair Oil & Gas Co.'s No. 1 School Land, NW cor. NW Sec. 22-5-3 ..... Building rotary rig; old total depth, 3,865 ft. Core 4,624 ft.
Ramsey Brothers' No. 1 School Land, NE SW SW Sec. 21-5-5 ..... Drilling 100 ft.
Ramsey Brothers' No. 1 Unknown, NW NE Sec. 27-5-5.... Fishing tools, total depth 4,681 ft.
Ramsey Brothers' No. 1 School Land, SE SE Sec. 34-4-1.. Drilling 3,110 ft.
Gladys-Belle Oil Co.'s No. 1 Iserial, SW NE Sec. 25-3-7 Drilling 4,298 ft.
Valerius & Wilkinson's No. 1 Unknown, SE cor. NE Sec. 25-3-7 ..... Drilling 2,875 ft.
H. F. Wilcox Oil & Gas Co.'s No. 1 Zea, NE SW Sec. 28-3-13 ..... Shut down 3,765 ft.
Skaer and others' No. 1 Mathis, SW NE NE Sec. 17-3-28.. Drilling 3,170 ft.
Ross Fenton and others' No. 1 Graves, NE NE Sec. 2-2-9.. Spudded and shut down.

TEXAS COUNTY

Danner Oil Co.'s No. 1 Graves, NE cor. SW SW Sec. 23-2-18 ..... Shut down 700 ft.
Newsom and others' No. 1 Allison, SE SE Sec. 4-1-12.... Shut down 4,040 ft.
Dotton and others' No. 1 Baker, C NW Sec. 4-1-13..... Hole full of water 3,318-58 ft.; drilling.
H. & H. Oil Co.'s No. 1 Hitch, NE cor. NE, Sec. 26-1-15... Shut down 600 ft.
Three Way Oil Co.'s No. 1 Cane, SW NW Sec. 11-1-18... Hole full of water 3,318-58 ft.; drilling.
Conley and others' No. 1 Unknown, SE cor. NW Sec. 5-1-19 ..... Spudded and shut down.

SOUTHERN OKLAHOMA
BRYAN COUNTY

Green Oil & Ref. Co.'s No. 1 Kemp, SE cor. NW NW Sec. 28-8s-9 ..... Shut down 600 ft.
Alexander & Oppenheimer's No. 1 Hampton, SE cor. NE Sec. 26-7s-11 ..... Shut down 1,425 ft.

JEFFERSON COUNTY

J. R. McCoy and others' No. 1 Smith, SE cor. NW Sec. 14-7s-6w ..... Rigged up and shut down.

CHOCTAW COUNTY

Hugo Gay's No. 1 Smith, SE cor. SW NW Sec. 27-6s-16... Shut down 1,540 ft.
Choctaw Petroleum Co.'s No. 1 Wilson, SW cor. SW Sec. 15-6-19 ..... Shut down 1,346 ft.

TILLMAN COUNTY

A. N. Peterson's No. 1 Mounts, SW cor. SW Sec. 3-5s-15w. Rig.
Fred Chopman's No. 1 Nelf, NE cor. NW NE Sec. 11-5s-4 ..... Shut down 380 ft.
Landfair and others' No. 1 Smith, SE SW SE Sec. 6-2s-16w ..... Shut down 2,280 ft.

MARSHALL COUNTY

Kennedy Drilling Co.'s No. 1 Sacra, SW NE SW Sec. 17-5s-5 ..... Shut down 1,810 ft.
Laurel Oil & Gas Co.'s No. 1 Chastine, SE NW Sec. 26-4s-5 ..... Drilled to 3,055 ft. and abandoned; rigging rotary to drill deeper.

STEPHENS COUNTY

Pierce & Brown's No. 1 Garland, SE NW NE Sec. 34-2s-6w ..... Shut down 1,700 ft.

JOHNSTON COUNTY

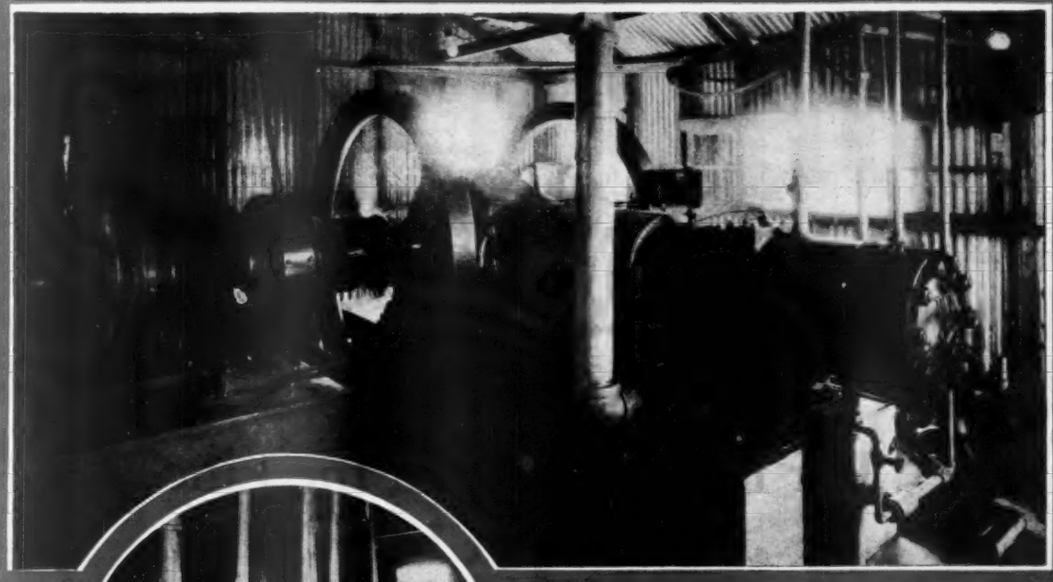
McPherson and others' No. 1 Wyand, CSL NE NW Sec. 7-2s-9 ..... Shut down 4,400 ft.
Wapanucka Oil Co.'s No. 1 Banks, Sec. 28-2s-9..... Show of oil 2,181 ft.; shut down.

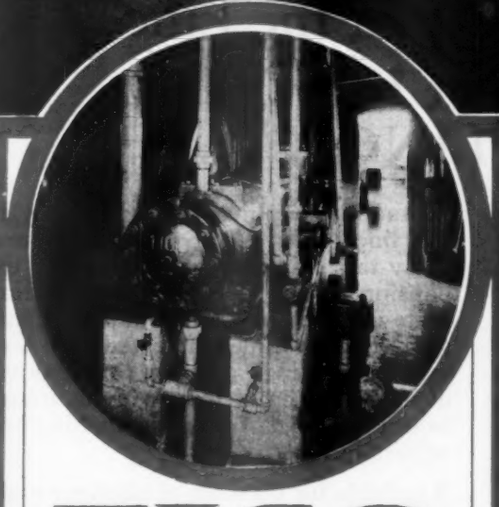
CARTER COUNTY

Grooms and others' No. 1 Morris, CSL NW NE Sec. 19-1s-2w ..... Shut down 3,463 ft.

MURRAY COUNTY

Thompson Oil Co.'s No. 1 Freeman, SE cor. Sec. 27-1s-3... Rig.





TICO 45 HP -GAS- ENGINES

UNEXCELLED FOR CABLE TOOL DRILLING

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It is this all around economy and dependability that have established the unexcelled popularity of the trusty Tico Gas Engine in cable tool operations throughout the Petroleum World.

Send for our new descriptive Bulletin T-52. Gives you all the facts about this modern masterpiece in gas engines. Your Continental Supply Man will be glad to demonstrate its merits.

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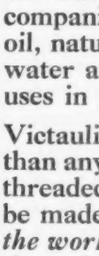

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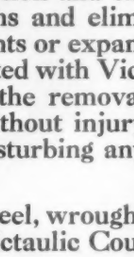

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FLOOD WATERS OF BRADFORD POOL AND RELATION TO OIL PRODUCTION

By Paul D. Torrey*
Bradford, Pa.

The Northwestern Pennsylvania Oil Producers Association and the United States Geological Survey have co-operated in conducting a preliminary study of the character of the flood waters, the relationship of changes in concentration of the salts dissolved in these waters to ultimate flood-oil production, and the original association of oil and water in the Bradford Field. Bradford has long been recognized as a dry-sand field. As a matter of fact, there had been little information available on the oil field waters of northern Pennsylvania until this investigation was undertaken.

Practically all of the oil produced in the Bradford Field comes from one horizon, generally known as the Third, or Bradford sand. Originally, it was believed that the Bradford sand was equivalent to the Third sand of Venango County, Pennsylvania, and the name "Third" unfortunately still persists, although shortly after the discovery of the Bradford Pool, Carll determined that there was a stratigraphic interval of approximately 1,000 feet between the two horizons. The Bradford sand, although varying considerably in thickness and lithology within local areas, is persistent throughout the field. It is of marine origin and, upon both paleontological and stratigraphic evidence, is regarded as a basal member of the Chemung formation.

Association of Oil and Salt Water

The accumulation of oil in the Bradford Pool has been definitely controlled by a large dome, with a closure of about 150 feet. The productive area covers over 85,000 acres, possibly the largest continuous area of oil-productive territory from one sand in the United States. On all sides of the field, there is a very definite oil-salt-water contact. Along the eastern edge, this contact is somewhat irregular in places; but oil production appears to be partly limited here by a thinning of the sand rather than entirely by structural conditions. The dip over a greater part of the field is comparatively low and fairly uniform. Along the southern and western limits of the field, oil is frequently found in the upper, and water in the lower, part of the sand. The same condition occurs in several local areas within the pool, where there are small structural depressions in the sand.

Wells drilled outside of the field normally find a small amount of oil in the Bradford sand, which appears to be homogeneously mixed with salt water throughout its entire thickness. The proportion of oil to water that can be produced in such areas, however, is so low that such wells can rarely be economically operated. Similar associations of oil and water are known to exist in other Appalachian fields, and one instance has been especially well described by Munn. Such conditions, within the Bradford area, apparently exist only in the synclinal parts of the region where there has been insufficient lateral fluid movement to cause a gravitational separation of the oil and water.

Occasionally, a new well, located several miles from the oil-salt-water contact, will encounter a small amount of water in the sand. This appears to be derived from lenses of low permeability of the reservoir rock, since it is soon exhausted by systematic pumping. At present, very few natural wells produce any salt water, although some of the older operators report that, during the early life of the pool, a little water was produced from wells in areas now regarded as dry. The presence of water with oil was looked upon with great concern. In one instance, a property, which is believed to have been highly productive, was prematurely abandoned on this account.

Although the limits of the productive area of the pool were soon defined by drilling, and the position of the edge-water line located, there is little evidence that a definite water encroachment has taken place such as is known in certain western pools. From the most reliable information obtainable, the oil-water contact has remained practically stationary during the past life of the field, and at present there is no indication of water movement. On several edge properties, it has been found possible to remove almost all of the connate water (natural salt water) by continued pumping, and, although large volumes of salt water are known to exist in their immediate vicinity, there is no evidence that water is moving in to replace that which has previously been removed. It is probable there are a number of contributing factors responsible for this rather unusual condition. The only possible outcrop of the Bradford sand is to the north. It cannot be recognized in well records from Warren County, as has been pointed out by Butts, and it is known to thin out a short distance east of the present boundaries of the field. The basal beds of the Chemung formation, in New York, contain several sandstones which are in many ways similar to the Bradford, but there are no means of making a definite correlation between them, and it is considered likely that these beds represent a period of fairly uniform conditions of sedimentation over a large area rather than the continuation of one individual sand. It is quite possible the sand does not outcrop, and that, consequently, it cannot receive additional water from the surface.

Even if one of the basal Chemung sandstones, on the outcrop, is the Bradford, there is considerable question whether there would be any great artesian movement through sandstones of low permeability such as characterize the lower part of this formation, for a distance of approximately 40 miles, with a regional dip of only 30 to 40 feet to the mile. The resistance of the sand to fluid movement, within the field, is so great that standard flooding practice requires a spacing of wells from 100 to 200 feet apart. Under a wider spacing pattern, the movement of the flood water is so slow that the greater time required to deplete a given area makes the average flood unprofitable.

From this evidence, it is believed that water encroachment is practically impossible, and that the connate water which partly surrounds the productive area of the Bradford sand is in a stagnant condition. This condition is probably due to the fact that the sand receives no additional water from the surface that might cause the connate water to advance, and that the resistance of the reservoir rock is sufficiently high to prevent extensive fluid movement.

Connate Water

Analyses of the connate water from the Bradford sand show very little variation in concentration of dissolved salts. The analysis in Table 1 can be accepted as representative of the connate water, and for comparison, a mean of 77 analyses of sea water, collected by the Challenger Expedition is given.

Since the Bradford sand is of marine origin, it may be assumed that the connate water in certain areas is concentrated sea water, changed by deep seated evaporation and possible reactions with the country rock. The large increase in the concentration of the calcium radical and the decrease in concentration of the sulphate radical are especially notable.

Ground Water

The water used in flooding the oil sand consists of ground water, or meteoric, water held in the surface soil and outcropping rocks. Some concern has been expressed by many of the operators that, as flooding is more widely practiced, the supply of ground water will not be sufficient for the needs of extensively op-

*Before A.I.M.E., New York Meeting.
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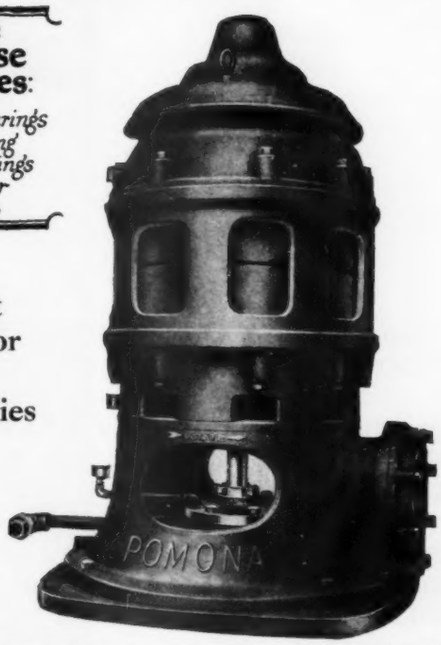

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erated properties. In certain parts of the field, this is a very serious consideration, especially on the projecting hills where the water can escape on three sides through springs. The water table, in a general way, conforms to the surface topography. The additional cost of drilling on the tops of hills may be partially returned by a more rapid flood movement, due to the greater pressure on the sand from higher water columns in the water intake wells. Decreases in the production of flood wells have frequently been attributed to seasonal variations in rainfall, which cause corresponding changes in the level of the water table. In areas where the sand is of fairly uniform porosity, the topography of a property should certainly be considered in planning a new flood.

Table 1—Analysis of Connate Water from the Bradford Sand and Mean Analysis of 77 Samples of Sea Water

Constituents in parts per Million—	Connate Water[1]	Sea Water[2]
Ca	13,260	420
Mg	1,940	1,300
Na	31,950	10,710
K	650	390
CO_3	0	70[3]
HCO_3	0	0
SO_4	730	2,700
Cl	77,340	19,410
Br	320	
I	10	

Reacting Values	Connate Water,[1] Pct.	Sea Water,[2] Pct.
Alkalies		
Na	31.1	38.6
K	0.6	0.8
Alkali earths		
Ca	14.8	1.8
Mg	3.5	8.8
Strong Acids		
SO_4	0.7	4.6
Cl	49.3[b]	45.2
Weak Acids		
CO_3	0	0.2
HCO_3	0	0

Change in Concentration of Dissolved Radicals from Sea Water to Connate Water

Ca	×31.60
Mg	× 1.49
Na	× 2.97
K	× 1.66
SO_4	× 0.27
Cl	× 3.98[b]

[1]Brine from Bradford sand, collected May 4, 1926, while well was being pumped, from No. 23 Stover (Associated Producers Co.). This well produces considerable salt water, and is located in the extreme southern part of the field. Analyzed by E. A. Swedenborg.
[2]Mean of 77 analyses of sea water collected by the Challenger Expedition.
[3]Reported and calculated as CO_3, but probably in part HCO_3.
[b]Includes Br and I.

The concentration of dissolved salts in the ground water is very low and fairly uniform throughout the field. Small increases in concentration have been noted during dry seasons. The analyses in Table 2 are of samples taken from widely separated wells. The samples are obtained by the use of a small bailer.

Table 2—Analyses of Ground Water from the Bradford Field

Constituents in Parts per Million—	1	2	3
Ca	68	38	73
Mg	13	10	14
Na and K	8	60[a]	7
CO_3	0	0	0
HCO_3	234	185	230
SO_4	28	18	28
Cl	14	68	17

1. Water from intake well C4, Hawkins Bryner property (Petroleum Reclamation Co.). Collected May 12, 1926. Analyzed by C. S. Howard.
2. Water from intake well 53, Hall property (Kendall Refining Co.). Collected March 30, 1926. Analyzed by C. S. Howard.
3. Water from intake well O4, Flood 11, Tyler property (Forest Oil Corp.). Collected July 13, 1926. Analyzed by C. R. Wright.
[a]This water may be slightly contaminated by flood water pumped from near-by oil wells.

The chief acid radical of the ground water is bicarbonate, and the presence of bicarbonate in water pumped from an oil well indicates that there is either a leak in the casing or that there is flood water coming into the well, since the connate water contains no bicarbonate.

Flood Water

The first few samples of flood water that were analyzed showed a large variation in concentration of dissolved salts. The water from wells spaced far away from the water-intake wells carried a high saline content, while those near the water-intake wells produced water of much lower concentration. Table 3 has been compiled to illustrate this feature. A comparison of individual well-production records, with changes in saline content of flood water, gave a corresponding correlation; i.e., the amount of dissolved salts in the water is a function of the total water produced. The flooding operation is not only removing oil from the sand, it is also washing the sand free of salts.

Table 3—Analyses Showing Change in Saline Content of Flood Water from Wells of Unequal Spacing from the Main Flood Line

Constituents in parts per Million—	1	2	3	4
Ca	548	686	452	8,422
Mg	59	106	172	1,460
Na and K	1,365	2,203	4,615	21,510
CO_3	0	0	0	0
HCO_3	481	559	392	14
SO_4	1,039	1,990	1,416	15
Cl	2,200	3,125	7,140	52,280
Total	5,692	8,669	14,187	83,701

Samples collected April 23, 1926. Analyzed by C. S. Howard.
1. Flood water from Hawkins Bryner No. 10 (Petroleum Reclamation Co.), located 90 ft. from water-intake well.
2. Flood water from Hawkins Bryner No. 22 (Petroleum Reclamation Co.), located 350 ft. from water-intake well.
3. Flood water from Hawkins Bryner No. 11 (Petroleum Reclamation Co.), located 440 ft. from water-intake well.
4. Flood water from Hawkins Bryner No. 12 (Petroleum Reclamation Co.), located 800 ft. from water-intake well.

The first water that is produced from a flood well is a very concentrated solution, almost as strong as the connate water, or even stronger.

Table 4—Analyses of Connate and First Flood Water

Constituents in Parts per Million—	1	2	3	4
Ca	13,260	9,540	10,050	7,356
Mg	1,940	1,565	1,580	1,215
Na and K	32,600	25,570	*39,470	20,270
CO_3	0	0	0	0
HCO_3	0	38	40	37
SO_4	730	1,081	34	825
Cl	77,340	60,040	83,180	47,170

1. Connate water from Stover No. 23 (Associated Producers Co.). Collected May 4, 1926. Analyzed by E. A. Swedenborg.
2. Flood water from Hawkins Bryner No. 27 (Petroleum Reclamation Co.). Collected April 27, 1926. Analyzed by C. S. Howard.
3. Flood water from Hawkins Bryner No. 12 (Petroleum Reclamation Co.). Collected March 31, 1926. Analyzed by C. S. Howard.
4. Flood water from Neath Bolton No. 63 (Kendall Refining Co.). Collected April 22, 1926. Analyzed by C. S. Howard.
*Water taken from receiving tank about one hour after well had been pumped. Unless otherwise noted, all flood water samples were collected while the well was being pumped.

A comparison of the analyses of connate water, given in Table 1, with analyses of samples from wells which were just beginning to produce flood water is given in Table 4.

Changes in concentration of dissolved salts in the water from one well are, of course, comparatively slow. Table 5 gives a series of analyses of samples taken from one well over a period of about six months. This well is about 90 feet from a water-intake well, and it had been producing water for approximately 20 months before the first samples were obtained.

It cannot be expected that the decline in saline content will be exactly uniform. Seasonal variations in the level of the water table will affect the amount of water going into the sand through the intake wells, and variations in porosity will cause a differential movement of the water, so that one bed may be effectively depleted of its oil and salt content long before a tighter bed is washed clean. The decline in total dissolved salts, although somewhat irregular, is fairly persistent, except where new water wells have been let in, or the water has been turned into

Table 5—Analyses of Water Samples from Hawkins Bryner No. 10 (Petroleum Reclamation Co.), Showing Change in Concentration of Dissolved Salts with Time*

Constituents in Parts per Million—	Date of Collection 3-31-26	4-23-26	5-12-26	6-21-26	9-13-26
Ca	436	548	458	428	408
Mg	59	59	52	56	56
Na and K	1563	1365	1326	1310	1238
CO_3	0	0	0	0	0
HCO_3	561	481	405	373	340
SO_4	938	1039	909	863	770
Cl	2450	2200	2100	2082	2025
Sum of constituents determined	5907	5692	5250	5111	4836

*Analyzed by C. S. Howard and W. D. Collins. This well had been pumpign flood water for over two years before the first sample was taken.

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the sand through old wells in the vicinity of the main flood. Occasionally there may be an increase in one radical but this is never permanent except in the case of the bicarbonate radical, which gradually increases during the early life of a flood well.

A direct comparison between oil and water production and the variation in the saline content of the water has been made for the wells of the C Flood Line of the Petroleum Reclamation Co. This locality was selected because a large number of old wells were located beyond the point where immediate drilling would not be required for ordinary flooding operations, most of them pumping a small amount of water. A few of the wells on

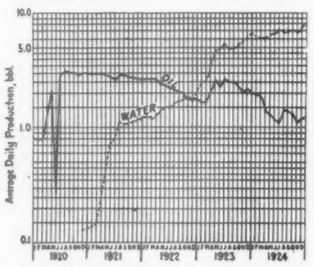

Figure 1—Decline curve of a typical flood well in the central part of the Bradford Field which shows evidence of differential flooding action.

this line were producing flood oil before systematic production gauges were kept; consequently, the records for some are incomplete.. In order to give a relative idea of the position of the flood, a ratio, determined by dividing the total water production by the total oil production over a period extending from January, 1925, to September, 1926, inclusive, was used. This method is a slight modification of one suggested to the author by Dr. R. E. Somers, of the Oil and Gas Department of the University of Pittsburgh, who has used it in studies of the New York fields. When contoured on a property map, the ratios give an excellent idea of the position and direction of movement of the flood.

If the records of total oil and water production are available, it is much more satisfactory to compare accumulative production with saline content. This comparison is more useful in predicting future production because a ratio of water divided by oil can give only a relative idea of past results and an indication of the direction of flood movement. In areas where there are considerable horizontal variations in the permeability of the sand, the use of ratios might be very misleading; i. e., a ratio of 10 might mean effective depletion in a porous body of sand, whereas a considerable amount of oil would be left in a tight sand where there has been little opportunity for uniform water movement. However, in general, a well that has a ratio of 20 cannot be expected to produce much more oil.

It was soon discovered that a complete analysis of every water sample was not necessary for the desired purposes. A determination of the chloride radical is all that is needed in most cases. Chloride is the predominating acid radical in the water, and, as chloride salts are so generally soluble, their content in the flood water is probably much more uniform than the sulphate salts. Chloride is certainly much more reliable than the alkali or alkali earth radicals. The chloride content, in samples of water collected on Sept. 13, 1926, from this group of wells, was plotted against the water divided by oil ratios, and an average curve calculated, which is given in Figure 3. It would hardly be possible to apply this curve to the entire field, since it was developed from data available from a very restricted area. In the few cases where the curve could be checked against production records from other properties, it gave fairly accurate results.

Where accurate production records are not available, analyses of water should give very valuable information regarding the rate and direction of movement of a flood. It is possible, merely by inspection of an analysis, to estimate how nearly the sand, surrounding the well from which the sample was obtained, is depleted; furthermore, it is believed that analyses can be put to a very good use in assisting in the prediction of future production from a given well. Obviously, the accuracy of a comparison of this character depends largely on the reliability of the production records upon which it must be based. It certainly cannot be universally applied throughout the field with the results that might be expected on properties where it is possible to check its accuracy.

Concentration of Connate Water

The very striking differences in the concentration of certain of the radicals in the Bradford connate water, as compared to the present day sea water, have been briefly mentioned under the description of the connate water of the field. In Table 1, it was shown that the change in concentration of the radicals had not been uniform. Table 6 shows that there is a considerable difference, not only in the concentration of the principal dissolved salts, but also in the composition of the dissolved salts.

Table 6—Approximate Composition of Principal Salts in Bradford Connate Water and in Mean Analysis of 77 Samples of Sea Water Collected by Challenger Expedition

Constituents in Grams Per Liter—	Sea Water[1]	Connate Water[2]
NaCl	27.22	81.208
$CaCl_2$		36.723
$MgCl_2$	3.78	*0.639
$MgSO_4$	1.66	
$CaSO_4$	1.42	
K_2SO_4	0.76	1.448
K_2CO_3	0.15	
Error in calculation and analysis	0.01	0.070

[1] Mean of 77 analyses of sea water collected by the Challenger Expedition.
[2] Connate water from Stover No. 23 (Associated Producers Co.).
*Excess of Mg amounting to 0.245 gram may possibly be in solution as $Mg(OH)_2$.

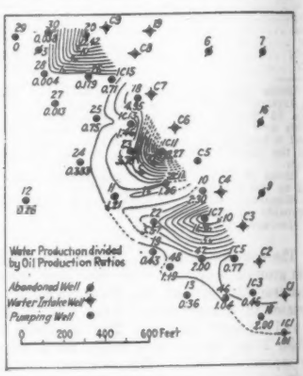

Figure 2—Map showing contours of water production divided by oil-producing ratios for the wells of the C flood line of the Petroleum Reclamation Co.

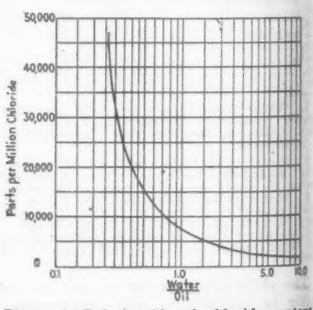

Figure 3—Relationship of chloride content of flood water to water divided by oil ratios of total production for wells of the C flood line of the Petroleum Reclamation Co.

It is believed that this change has been restricted to within the sand itself. In a previous paragraph, it has been emphasized that there is little chance for ground water to get into the sand at the outcrop. In addition to this, there is no evidence of surface or subsurface faults which might allow water migration from other water-bearing strata into the sand. As the beds both above and below the sand are relatively impermeable, it is highly probable that the Bradford connate water has not been subject to changes by reactions with, or to dilution by, migrating waters from other

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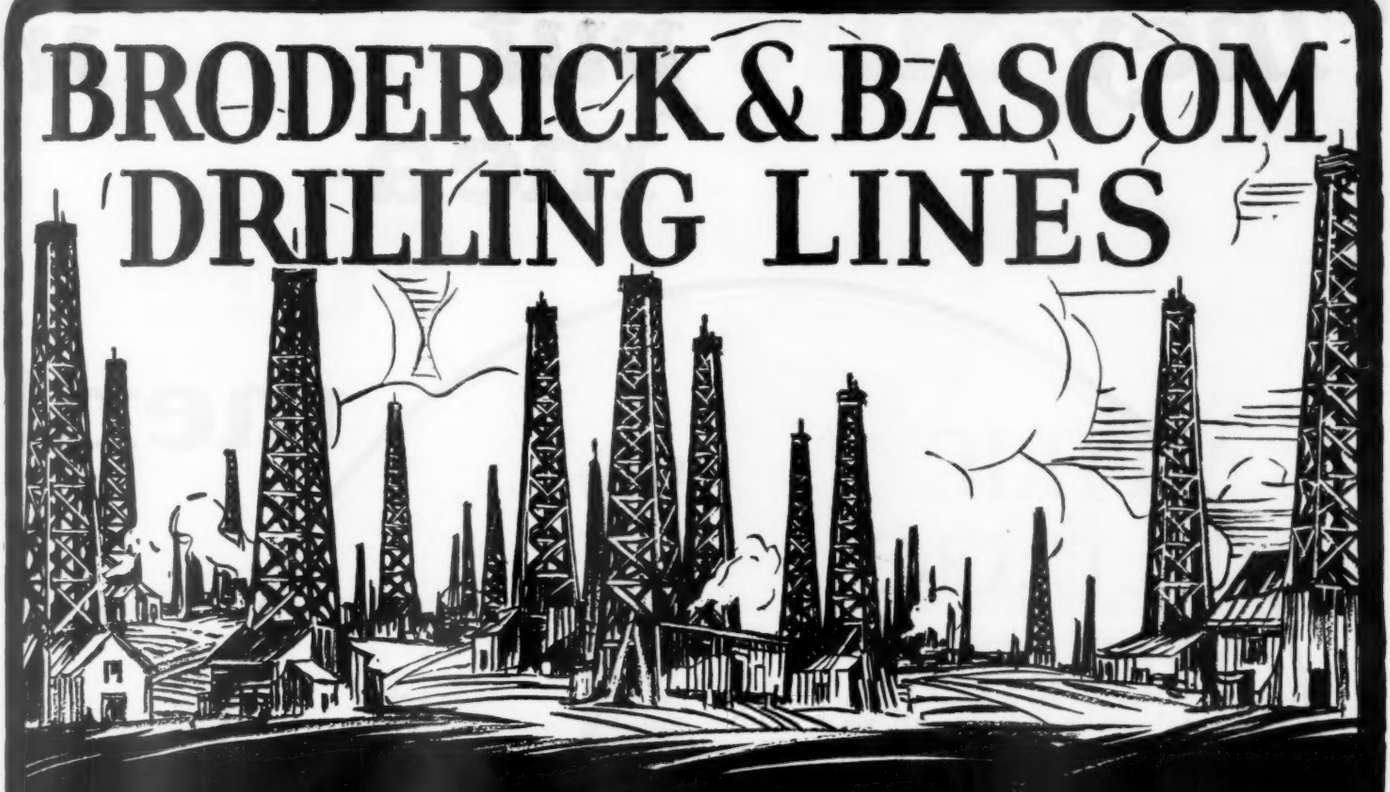

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sources, or to changes by the leaching of salts from the country rock, such as might exist in a widely wandered water.

The theory of Mills and Wells, that the concentration of the oil-field water is due to the evaporation of the water into moving and expanding gas, seems to apply very well to the conditions at Bradford, especially if there were one or more periods of somewhat elevated temperature corresponding to a deeper burial of the sand. It is reasonably certain that the entire reservoir rock was at one time completely saturated with sea water. The salts which are dissolved by the flood water must be, at least partly, crystallized in the sand. The precipitation of these salts might be explained by the gradual evaporation of the water at irregular intervals during the period of deposition; however, this does not seem likely, as there is no evidence of any great discontinuity in sedimentation. The top part of the sand is generally very calcerous and fossiliferous. This fact would indicate marine conditions during the final stages of deposition and would thus permit a saturation of the sand with sea water prior to its final burial by succeeding beds.

Oil accumulation in the Bradford anticline must have been very slow. Assuming an average thickness of 30 feet of sand and a porosity of 15 per cent, there would have been, originally, about 3,161,000,000 bbls. of salt water in the sand within the present limits of the field. This water must have been partly removed during the migration of oil into the pool. Part of the original water of sedimentation was probably removed by the compacting of the beds and additional amounts may have been pushed away by the cementing of the sand grains, but this possible change in volume of pore space has been more than allowed for by assuming a relatively low porosity for an unconsolidated sand. Considering the resistance of the reservoir rock to fluid movement, the time required to remove this large volume of water by evaporation or displacement by gravitational separation of water by oil might easily have covered several geologic periods. It is probable that migration ceased when the capacity of the fold was reached. There is possibly even more oil in the sand outside of the limits of the pool, which cannot be recovered economically, at the present time, due to the large amount of water associated with it, than there is within the present productive area of the field. It seems logical to believe that had the fold been larger, the accumulation of oil would have been correspondingly greater. The oil apparently is available, but there does not seem to be a place large enough for its entire segregation.

It will be noted from Table 6 that the concentration of sodium chloride in the connate water, in grams per liter, is approximately three times greater than the concentration in present-day sea water, and, since this salt would hardly be affected by any possible reactions with the country rock, it is probably the best compound to use as a criterion for estimating the amount of relative concentration by deep-seated evaporation. This concentration probably corresponded to oil migration, the saline content of the water increasing as accumulation continued. The first oil and gas moving into the fold would naturally occupy the highest parts of the structure. Migrating gas has a decided tendency to evaporate water and as it moved into the higher parts of the structure probably some of the water was carried with it; a small amount of salts would be deposited by the removal of the water, and the remaining water would be pushed down the dip. A continuation of this process would gradually move an increasingly concentrated brine out of the fold. This feature is well illustrated by two important characteristics of the flood water: (1) a decided increase in the chlorine content of the initial flood water from wells located high on the structure to those located down the dip near the oil-salt-water contact, and (2) by the fact that flood water usually contains a much greater percentage of sulphate salts than does the connate water. The sulphate salts, being generally less soluble than the chlorides, were precipitated first and left in the sand, while the chloride salts were, in a greater percentage, held in solution. The amount of sulphate salts in flood water varies considerably. Their precipitation does not seem to have been nearly as uniform as the chlorides; they are, therefore, of little value as indicators of flood movement. In some instances, the first flood water produced will contain a very low concentration of sulphates. As the flood advances, however, there will be a gradual increase in the sulphate radical until the peak of production is reached; then its concentration will decrease with the decrease in concentration of the other salts, and with the decline in oil production and the increase in water production. This variation from the general statement that "the saline content of the water declines with the advance of the flood" may be explained by the requirements of the solubility-product principle, as applied to calcium sulphate, and also by the fact that the chloride salts, being the more soluble, are more readily held in solution; therefore, they appear as a large percentage of the total solute in the first flood water produced by a well. As increasing quantities of water are available, the sulphates which dissolve more slowly, begin to go into solution.

It should be noted that the total amount of salt dissolved in the flood water is largely dependent on the amount of water produced. The water from a partly flooded out well may be low in concentration compared with the first flood water, but the total saline content will be much larger than from a well which produces a small amount of highly concentrated solution. This may possibly be due to differential flooding action in the sand body. The porous parts are more readily washed free of oil and salt. The water, subsequently moving through these horizons, is a relatively dilute solution, while the water moving much more slowly in beds of low porosity comes into the well in small volume but as a very concentrated solution. This solution is diluted to a certain extent by the water of low concentration, and it gives a large quantity of solute in a fairly dilute solution. In Table 7, the concentration, in parts per million, of the analyses of the water samples given in Table 3, is compared with the production of oil and water of the wells from which the samples were obtained, and also with the quantity of salts in the water.

Table 7—Relationship of Water Production to Total Quantity of Dissolved Salts

Well No.	*Average Daily Production of Oil in Liters	*Average Daily Production of H_2O in Liters	†Total Dissolved Salts in Parts per Million by Weight	*Approximate Quantity of Salt Produced in Kilograms
1	603.9	2,174.3	5,692	371
2	88.9	483.1	8,669	126
3	76.3	122.3	14,187	52
4	47.6	25.4	83,701	67

1. Flood water from Hawkins Bryner No. 10. (Petroleum Reclamation Co.).
2. Flood water from Hawkins Bryner No. 22 (Petroleum Reclamation Co.).
3. Flood water from Hawkins Bryner No. 11 (Petroleum Reclamation Co.).
4. Flood water from Hawkins Bryner No. 12 (Petroleum Reclamation Co.).

*For April, 1926.
†Samples collected April 22, 1926.

Chemical Changes in Concentration

The change in concentration of sodium chloride from present-day sea water to the Bradford connate water can be explained by the physical actions previously described, but the large increase in the calcium radical and the smaller increase in the magnesium radical must be due, in part, to chemical reactions. It will probably have been noted, in Table 6, that, in attempting to balance the analysis of the connate water, there is an excess of basic elements. This excess has been arbitrarily assigned to magnesium, since its salts are relatively less stable than the salts of the alkalies, or of calcium. Watts' Dictionary of Chemistry specifically states that "$MgCl_2$ is partly decomposed by much water to MgO and HCl." This same reaction has been used

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by Mills and Wells in discussing chemical changes in the solute. Free hydrochloric acid in the water would readily react with the calcium carbonate of the calcareous cap rock, giving free calcium chloride, water, and carbon dioxide.

$$CaCo_3 + 2HCl = CaCl_2 + H_2O + CO_2$$

The carbon dioxide liberated may well be the source of the small percentage of CO_2 so commonly found in natural gas. Magnesium hydroxide is slightly soluble in water and it is possible that the excess of basic elements, previously referred to, may be accounted for by its presence in the water.

$$MgCl_2 + 2H_2O = Mg(OH)_2 + 2HCl$$

Although the sodium chloride, in the connate water, in grams per liter, is only three times that in present-day sea water the factor of three cannot be fairly used to calculate the amount of magnesium chloride that is available for hydrolysis, since a great deal of sodium chloride, together with other salts, may have been precipitated. It is possible that the original concentration has been increased locally, in times past, to a much greater extent than present evidence indicates.

CANADIAN FIELDS

(Continued from Page 55)

acreage, some of which is being tested by other companies. It holdings in the Turner Valley Field are about 200 acres. It is understood a test in the Skiff Field, and a second test in the Turner Valley Field are under consideration for the present season.

In the Pincher Creek Field, southwestern Alberta, Mount Royal Oil & Gas Co.'s No. 1, LSD 4, Section 7-6-1w5, is reported preparing to resume drilling at about 1,000 feet. In the Hillspring area, Alberta Gas & Fuel Co.'s No. 1 Doherty, Section 34-2-29w4, which spudded in a couple of weeks ago, is shut down owing to a broken casing. A 250-bbl. fuel oil storage tank is being set up.

Foremost Field

In the Foremost Field, southern Alberta, Canadian Western Natural Gas Co.'s No. 8, which finished last fall as a duster, is being dismantled. The derrick timbers will, it is understood, be used for No. 9 well, to be started this spring.

In the Milk River district, southern Alberta, Commonwealth Petroleum, Ltd. of Calgary will this spring start a commercial test on Verdigris Coulee. Milk River will be headquarters for the drilling operations. The same company is drilling at 2,330 feet in a test near Devon, Mont., with shows of oil and gas; swabbing tests are being made but if these fail to indicate commercial production the test will be continued into the top shales of the Devonian formation. Commonwealth Petroleum, Ltd. has recently leased some 2,000 acres on the Dutton Dome in Montana, south of the Teton River and north of the town of Dutton, drilling to start by June 1 of this year.

The H. C. & O. Co., a "no-jack" venture comprising O. D. Clark, H. P. Cope, William Olsen, P. W. Hysell and others is reported to have located a test on the Mrs. O. D. Clark acreage north of Sunburst, Mont., and about 3 miles east and 5 miles south of Sweetgrass. The company has about 1,400 acres lined up and drilling will start soon with Cope and Hysell in charge. The location is about 1½ miles west of the Unz gas well drilled in 1912 and the test will be the closest to Coutts-Sweetgrass to drill this spring.

Deep Test in Ontario

In the Ontario fields an important deep test drilled in Middlesex County by a Detroit syndicate has been abandoned in the granite at 3,700 feet. The location was the Inch farm, Metcalf Township, south of Strathroy. Roland Blackwell and Thomas Deacon handled the drilling. The test was dry except for a small show of gas at 3,600 feet. One of the biggest shots of dynamite and nitroglycerin ever used in an Ontario test failed to increase the production. The complete log of the well is as follows:

	Feet		
Surface		to	174
Delaware lime and Hamilton shale	174	to	215
Water		at	210
Delaware lime	215	to	230
Hamilton shale	230	to	255
Corniferous lime	255	to	290
Blackwater			290
Onondaga lime	290	to	660
Sand rock	660	to	775
Monroe gray lime	775	to	815
Brown lime	815	to	825
Gray lime	825	to	870
Gray lime and slate	870	to	880
Gray lime	880	to	890
Brown lime	890	to	895
Gray lime and slate	895	to	915
Gray lime	915	to	925
Gray lime and slate	925	to	960
Salina gray lime	960	to	975
Brown lime	975	to	980
Gray lime	980	to	1,000
Brown lime	1,000	to	1,020
Gray lime and slate	1,020	to	1,023
Brown lime	1,023	to	1,045
Gray lime	1,045	to	1,055
Brown lime	1,055	to	1,065
Gray lime	1,065	to	1,070
Brown lime	1,070	to	1,090
Gray lime	1,090	to	1,105
Gray lime and slate	1,105	to	1,155
Gray lime	1,155	to	1,180
Salt	1,180	to	1,387
Guelph brown lime	1,387	to	1,425
Gray lime	1,425	to	1,450
Dark gray lime	1,450	to	1,475
Dark shale	1,475	to	1,505
Gray lime	1,505	to	1,520
Light gray lime	1,520	to	1,525
Dark gray lime	1,525	to	1,540
Light gray lime	1,540	to	1,565
Dark gray lime	1,565	to	1,620
Sand rock	1,620	to	1,645
Gray lime	1,645	to	1,770
Dry shale	1,770	to	1,810
Gray lime	1,810	to	1,813
Gray shale	1,813	to	1,830
Gray lime	1,830	to	1,835
Gray shale	1,835	to	1,855
Red shale	1,855	to	1,860
Gray shale	1,860	to	1,875
Red shale	1,875	to	1,880
Gray shale	1,880	to	1,910
Gray lime	1,910	to	1,960
Medina shale			
Red shale	1,960	to	2,290
Hudson River shale			
Gray shale	2,290	to	2,530
Dark gray shale	2,530	to	2,650
Utica Blake slate	2,650	to	2,825
Trenton gray lime	2,825	to	3,680
Potsdam	3,680	to	3,695
Granite	3,695	to	3,700

The one small show of gas was met at 3,600 feet, within 80 feet of the bottom of the Trenton limestone. The casing in the well included 18 feet of 12-inch; 174 feet of 10-inch; 224 feet of 8-inch; 1,787 feet of 6¼-inch and 2,830 feet of 5-inch.

Turner Valley Field

In the Turner Valley Field southwest of Calgary, Royalite Oil Co.'s No. 4, LSD 12, Section 7-20-2w5, had a production for January of 19,435 bbls. The December production was 20,338 bbls. For January, 1927, the production was 18,737 bbls. Royalite Oil Co.'s No. 7, LSD 3, Section 13-20-3w5, which came into production a couple of months ago, showed for January a yield of 3,085 bbls. from the crude naphtha horizon in the Madison.

Royalite Oil Co.'s No. 10, NE Section 12-20-3w5, which recently got some oil production, estimated around 30 bbls. a day, at 2,332 feet will be drilled deeper. Perforated casing is being run to the bottom to get the production from the shallow oil horizon.

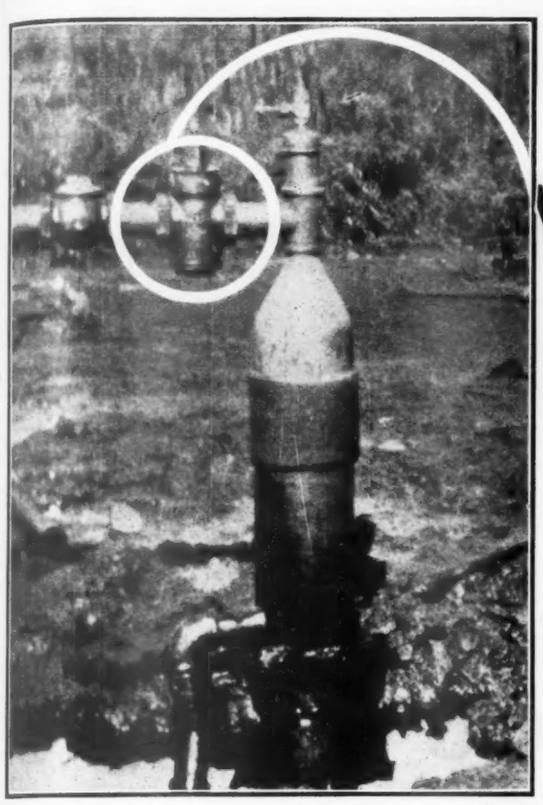
Dalhousie Oil Co.'s No. 1, LSD 4, Section 18-20-2w5, is at 4,422 feet and cleaning out the hole. This test is in the top of the deep lime. Dalhousie Oil Co.'s No. 5, LSD 16, Section 30-19-2w5, is at 4,870 feet and drilling. This test already has some production in the Fernie shale horizon. It started at 250 bbls. a day but is now making a settled production around 64 bbls. a day of light crude. It is being deepened to the crude naphtha hroizon of the Madison.

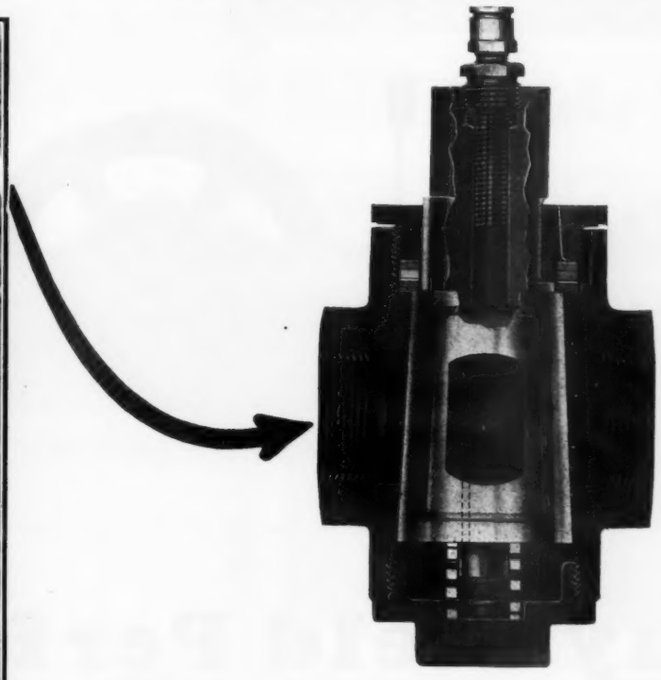
Vulcan Oils' No. 1, LSD 11, Section 13-20-3w5, which was again frozen early in February thawed out a few days ago and let go the naphtha with force enough to lift a 2-ton tank 175 feet distant off its foundations. The well makes around 110 bbls. a day of crude naphtha.

Illinois Alberta Oils' No. 1, LSD 14, Section 12-20-3w5, reported for the week ending February 4 a production of 681.2 bbls. of crude naphtha.

Resumes Drilling

McLeod Oil Co.'s No. 1, LSD 16, Section 1-20-3w5, has resumed drilling after cementing the 8¼-inch casing in the top of the Madison limestone at 3,855 feet. A wet gas flow approximating 2,000,000 feet a day was met some 200 feet above the lime. The test should get production about 200 feet in the lime, and an 8-inch pipe is being connected with the separators preparatory to drilling the well in. McLeod's No. 2, same LSD, at around 200 feet in the Madison got a wet gas flow estimated as high as 17,000,000 feet with a potential crude naphtha





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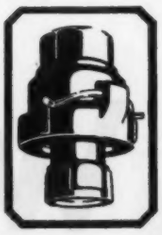

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recovery of 250 bbls. a day; but this was lost and the well eventually drilled several hundred feet deeper for a smaller production.

Calmont Oils' No. 1, LSD 2, Section 1-20-3w5, is drilling at 5,027 feet after a short delay fishing out a lost string of tools. Oka'ta Oils' No. 1, LSD 1, Section 1-20-3w5, is drilling in a very hard formation at 4,480 feet. Seneca Oils, LSD 1, Section 34-20-3w5, at 3,710 feet is drilling past a string of casing.

Imperial Oil, Ltd. western production headquarters at Calgary was transferred recently from the Lancaster Building to its enlarged office building on Sixth Avenue and Second Street west. The new office covers the entire ground floor. Drilling and production activities of Imperial Oil, Ltd., the Royalite Oil Co. and other Imperial subsidiaries in the Canadian West will all be handled from this office, J. H. McLeod being western production manager.

In the Moose Mountain district, west of Calgary, Signal Hill Oil Co.'s No. 2 LSD 9, Section 34-23-5w5, is drilling in the Blairmore-Dakota formation at 1,825 feet. As a precaution against caving, the hole is being cemented around 1,780 feet where there are 5 feet of caving formation in a soapstone. This soapstone is similar to the formation encountered in the Vulcan's No. 1 in the Turner Valley a short distance above production, and results of the deeper drilling in this test may be interesting. Representatives of an English syndicate have been looking over this area, and are negotiating with leaseholders for a block of acreage.

A foothill structure north of the Turner Valley, probably the Ghost River structure, will be tested this season by the Canadian Exploration Co. of Denver, Colo. The company was recently organized and is financed by Denver men interested in the Alberta fields, who have, it is understood, arranged to test some acreage b'anketed last year by International Utilities, Ltd. Present plans contemplate the drilling this season of one deep test, to start work before July 15. The structure is north of the Turner Valley and general conditions are thought to be somewhat similar.

It is reported that the Canadian Western Natural Gas Co. of Calgary is doing some further core drilling on acreage in the border district of southern Alberta.

On the Montana side, Mill City Oils' No. 1, SW Section 29-35-3w, is reported to have got an oil sand from 8 to 10 feet thick around 1,800 feet depth, between the black lime and the Madison. The sand looked good for 10 to 12 bbls. a day, which might be increased by a shot. Drilling is being continued into the Madison; but if nothing better is struck the well will be finished in the upper sand.

In the Lesser Slave Lake area, northern Alberta, International Oils, Inc. of New York, which last year abandoned its No. 1 test in Section 14-74-4w4, at 2,840 feet is reported arranging to drill a second test this year in the same area. No. 1 had some good oil showings, though it failed to develop commercial production.

In Saskatchewan the Ribstone-Wainwright syndicate test near Readlyn which has been shut down at 400 feet on account of weather conditions is preparing to resume drilling. Some slight shows of oil have been reported.

CALIFORNIA FIELDS

(Continued from Page 56)

No. 51 Lloyd, a new well, and this 6,647-foot project will probably be on production within the next two or three weeks. Nos. 100 and 102 on the Lloyd property may also be tanking oil within the next 30 days. The Shell's No. 19 Edison, the world's largest deep-zone producer, which showed an initial daily production late last week of 990 bbls. daily from the 7,100-foot level, subsequently built up to 1,500 bbls and has been holding steadily at 1,350 bbls. during the past several days. The Shell has just finished No. 20 Edison at 6,822 feet and a 5¾-inch oil string will be run in tomorrow. This new well should be followed into production by several others in the very near future and if everything goes along according to schedule the Shell's daily production should receive a substantial boost within the next 30 days unless curtailment measures are initiated in the meantime. The Petroleum Securities should also substantially boost its Ventura Avenue production within the next 30 days as this company has two wells on the Orton property and another on the Willett lease which should be completed between now and the end of March.

Rincon

A definite operating policy covering future development of the Rincon Field, located approximately 6 miles west of the prolific Ventura Avenue district, has recently been generally adopted as a result of a series of tests conducted during the past several weeks. The substantial increase in production expected to result from deep sand exploitation in the Long Beach Field has had a tendency to delay the drilling of a conclusive test at Rincon, and if the former field comes up to expectations operators will probably have their hands full in taking care of this production without inviting further trouble by deep drilling at Rincon. As a consequence, deep drilling at Rincon may be delayed indefinitely. Development work in this new field has been very unsatisfactory up to the present time and although 24 new wells have been started since the Pan American finished No. 1 State last November only 19,500 bbls. of marketable crude have been produced during this period. The small production shown is due to a water problem which is still delaying operations. The shallow State zone encountered around the 3,000-foot level is divided into an upper and lower portion by an intermediate water sand. This zone is approximately 500 feet thick at the apex of the structure but it is impossible to produce from the total amount of oil-bearing formation present due to the intermediate water sand. Operators have heretofore concentrated their efforts on producing from the upper portion of this horizon but the recent series of tests have changed the future operating policy and from now on production will be secured in the lower 300 feet, the upper portion being cased off. The Chanslor-Canfield Midway Oil Co., General Petroleum, Miley Oil Co., Pan American and Standard are all pursuing an active drilling campaign in this area and are assured of production if the water problem can be solved, as their respective holdings are favorably located with respect to structure.

Kern River

There were several new wells finished out along the West Front of the old Kern River Field during the past week but only one of them was actually put on production. This was George F. Getty's No. 3 McDougal, which resulted in a 350-bbl. pumper from 2,019 feet, the oil testing 15-1 degrees. Nos. 4 and 7 on the same property were also completed and both are scheduled for immediate production tests. The California Petroleum Corp. spudded in Nos. 1 and 2 on the M. O. F. property a few days ago and will have No. 5 Lehman on production within the next 48 hours. The Petroleum Securities should finish Nos. 11 and 12 in Section 22-28-27 some time during the coming week and both are assured of commercial production. Drilling operations in the Midway-Sunset Field have been at a low ebb for over a year and development work will undoubtedly continue to reflect this restriction for another several months at least. The Standard, which is running three strings of tools in this area at the present time, completed No. 52 in Section 29-31-24 a few days ago and this new well registered an initial of 382 bbls of 26.2 gravity oil from the 4,580-foot level.

There has been a very perceptible increase in drilling operations in the Round Mountain Field during the past several weeks due chiefly to additional work by the Honolulu Consolidated. This concern has six wells under way at the present time and while they all appear to be located in productive territory and therefore assured of production they will undoubtely be shut in immediately upon

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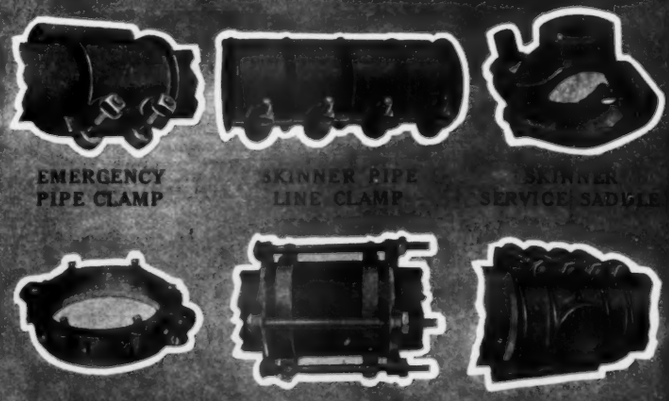

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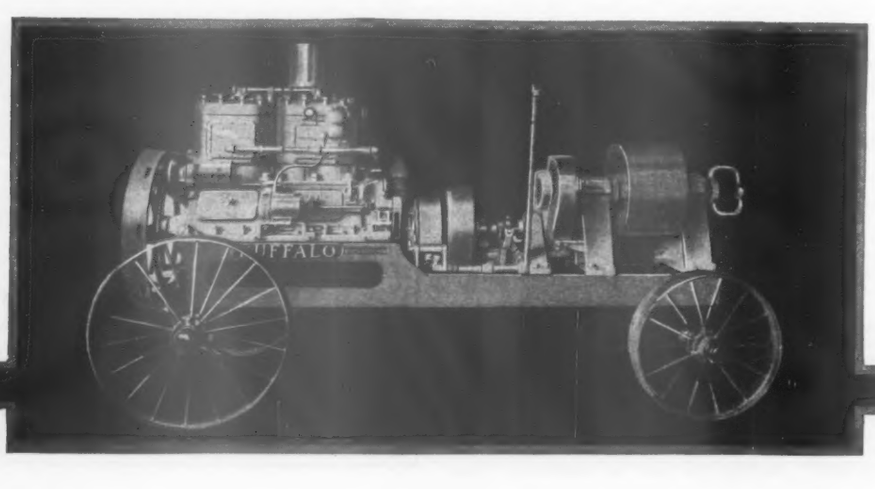

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completion, as there are no pipe line facilities available at the present time and it hardly seems likely that a special line will be put in for this undesired heavy oil within the next few months. The Shell is moving in rig material for No. 2 Jewett in Section 29-28-29 and this hole, which is about a half mile north of No. 1 Jewett, which recently made 120 bbls. per day, should be spudded in within the next two or three weeks. It is quite evident that the drilling operations of the Honolulu and Shell interests are resulting from lease requirements rather than for any other reason, as heavy oil is practically a drug on the market at the present time. Drilling operations in the Mount Poso Field are quite similar to the character of work under way in the Round Mountain district, located approximately 15 miles to the southeast. The Union and Shell have temporarily suspended work at Mount Poso and the producing wells completed up to the present time are shut in due to the absence of pipe line facilities. The General Petroleum spudded in No. 9 Glide, a new project in Section 21-27-28, a few days ago due to lease obligations and this well will undoubtedly be shut in upon completion. The Signal Gasoline Co. is rigging up an offset to the Union's No. 1 Tribe, a suspended producer in Section 28-27-28, and the Modoc Oil Co. has started rig construction for No. 1 Hyde in Section 32-26-28.

Potrero

The Potrero Field, located approximately midway between the Rosecrans and Inglewood Fields in Los Angeles Basin, has been very inactive during the past several months due principally to the fact that there is very little unleased acreage available for work. The Associated, following its failure to develop sustained commercial production in No. 1 Cypress, the discovery well, several months ago deepened this project and subsequently encountered a second horizon. Water trouble, however, has prevented the development of clean production in the lower sand at 5,408 feet. No. 2 Cypress, a second well, was started by the Associated in this district about a month ago and this project, which is located several hundred feet south of the discovery, is expected to result in clean production. The Petroleum Securities recently swung northeast of the Associated's No. 1 Cypress and spudded in No. 1 Connolly, the well being reported down 3,791 feet a few days ago. During the early part of 1927 the Julian Petroleum Corp. drilled a well on the Smith property a few hundred feet southeast of the Associated's discovery, No. 1 Cypress, but drilling operations were later suspended following the failure to pick up the horizon encountered by the Associated. This well was abandoned at 5,282 feet some time later and remained inactive for several months. Smith & Carpenter rebuilt a rig over this old abandoned hole about 60 days ago and carried it down an additional 126 feet. They failed to get a crude oil producer but will realize on their investment as this project came in as a commercial gas well. It was turned into the pipe line of the Midway Gas Co. a few days ago, the initial production being 10,000,000 feet from the 5,408-foot level.

The Goleta Field of Santa Barbara County will undoubtedly witness a very inactive period during the next several months, and if the action of the Miley Oil Co. is any criterion of the future outlook, development work will be negligible. This company recently listed every well on its Tecolote lease for abandonment. Seven wells were abandoned during the past week, four of them being former producers which have ceased to be economically profitable. These wells were exceptionally short lived due principally to rapid depletion, gas exhaustion and water difficulties. The General Petroleum took its No. 1 Kerwin at Edison off the beam during the early part of the week and this well, which recently opened up a new field about 7 miles east of Bakersfield in Kern County, has been plugged back preparatory to a further production test, which, it is hoped, will result in clean production. This well, originally drilled into bottom water at 4,006 feet but was subsequently plugged back and showed commercial production, although the output was never entirely free of water. The Edison district, opened up by the General Petroleum, will be further tested out some time within the next 60 days as the Midway Northern and Superior Oil Co. both have wildcats under way at the present time. They are located at some distance from the General Petroleum's well, however, and may not afford a satisfactory test of this structure as they may be outside the productive limits of the Edison Field.

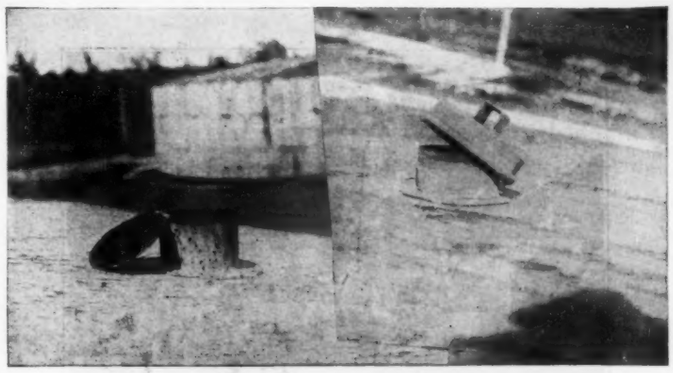
Northern California Wildcats

The Pacific Eastern Production Co. has had its discovery well at Fruitvale on a pumping test for the past several days and, while it shows a potentiality of 250 bbls., the excessive amount of gas present interferes with pumping operations. It is quite possible that the Pacific Eastern may put this well on a gas lift in the near future and this may take care of the present situation. The Superior tied up approximately 160 acres about 2 miles north of the Pacific Eastern's discovery well a week or so ago and the Little & Bell Production Co. leased a 40-acre tract adjoining it. The Shell has acquired several new leases northwest of the Pacific Eastern's Fruitvale discovery but immediate drilling is not contemplated. C. B. Wrightsman has just leased several hundred acres in the Lerdo area, located approximately 12 miles northwest of Bakersfield, and this property, which is about 6 miles northwest of the Pacific Eastern's discovery well at Fruitvale, is in line with Semitropic Ridge, which has exceptional possibilities.

J. E. O'Donnell spudded in his Greenfield test a few days ago and this well, which is located about 12 miles south of Bakersfield, will be pushed forward to an early completion. Clarence J. Berry, a prominent California operator, has located a test to be drilled in the Adobe Canyon area of Kern County and an early spud is contemplated. This wildcat, which is south and east of the Mount Poso Field, is about 2 miles north of the Superior's present wildcat and something like 3 miles east of the General Petroleum's No. 1 Glide, which recently extended the Mount Poso Field approximately 2 miles southward. The Standard has just abandoned its third structure survey hole in the Saticoy area of Ventura County and equipment is being moved to a fourth location. These shallow holes are being drilled in order to get a line on subsurface conditions and if sufficient evidence is found to indicate the existence of a structure a deep test will be drilled.

Southern California Wildcats

The Shell Oil Co. has taken over J. E. O'Donnell's Hawthorne wildcat, which has been standing suspended at 5,304 feet for the past several months, and the resumption of work will result in a conclusive test for this immediate area. One or two minor showings were logged in the O'Donnell well a little below the 4,000-foot level during the course of work but they were not deemed of sufficient importance to warrant the making of a production test. The Shell has taken over the Horowitz lease, upon which the O'Donnell well is located, and this acreage, together with that previously acquired, warrants a resumption of work, as the Shell will be in a position to judge the value of its lease in this area. The White Behr Petroleum has landed a string of 10-inch in its wildcat, located in the Watson tank farm area, at 4,610 feet. Several showings have been logged in this well but the casing recently landed is believed to be for protective purposes only. The Olympic Refining Co. is rotating ahead in its Sunset Beach wildcat at 3,800 feet, the formation being a hard gray sand. This wildcat is located between the Huntington Beach and Seal Beach Fields. The Associated's No. 1 Patterson, a wildcat at Rivera, is rotating ahead in a gray sand at 5,110 feet and the outlook for production is exceptionally discouraging.



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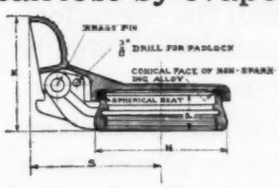

And when openings are not closed, even a good roof is no protection against fire and evaporation.

Consequently an old style gauge hatch is a most expensive thing to leave on a tank—and usually costs more in the first place than an Oceco— .

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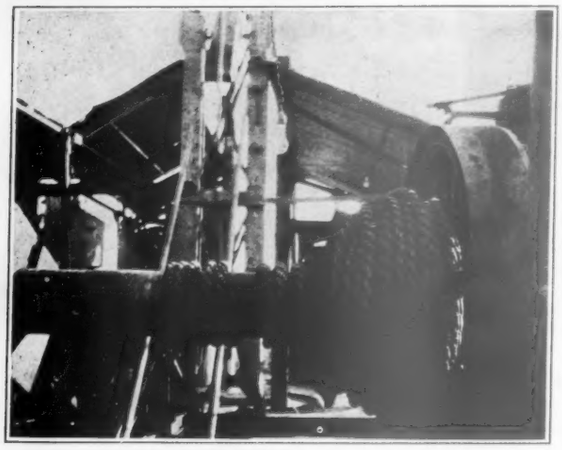

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Columbian Cable

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LA.-ARK. WILDCATS

(Continued from Page 46)

through the woods on a secret mission—probably in connection with an effort to get two offset 40 feet.

There has been a complete reorganization of the wildcat operations at Zwolle, Sabine Parish, formerly carried on under the name of L. M. Emlet and in the future these activities will be carried on with R. L. Gay, of Zwolle, as manager and H. D. Easton, of Shreveport, geologist, with New York backers. So far these New York backers are reported to have spent between $350,000 and $400,000 in this locality. The well in Section 14-7-14, which has been carried as Emlet's No. 7 Bowman-Hicks Lumber Co. is now listed as Zwolle Oil & Gas Co.'s No. 1 Bowman-Hicks and Emlet's No. 1 Mansfield Hardwood Lumber Co. in Section 15-7-14, is now R. L. Gay's No. 1 Mansfield Lumber Co. and is running two shifts on third hole. The other has patent sand tester stuck at 3,822 feet and is getting ready to sidetrack. Eight-inch casing was set at 2,467 feet and test showed for 25 bbls. per day with salt water and the hole deepened by coring through hard lime and shale to 3,785 feet where the core showed a little oil, the quantity increasing as coring was continued to 3,826 feet. Here the hole was reduced from 5⅞-inch to 4⅝-inch before breaking through the hard drilling. Paleontological report gives the formation as the Fredricksburg the pay zone of the Pleasant Hill Pool, 20 miles northeast.

Glenmora Petroleum Co. has made location for a rank wildcat in Section 1-2s-1w, Evangeline Parish and has derrick up for what is claimed will be a deep test, possibly 5,000 feet if necessary.

Strike Fresh Water Again

In Arkansas, McKenzie Oil Co. repeated in No. 1 Eakin, Section 9-11-19, second hole, the same experience they had with fresh water and at about the same depth in the second hole, same location. Testing water in 2 feet of sand at 643-45 feet they skidded 50 feet north and drilled second hole to the Nacatoch at 646 feet and got fresh water in 4 feet of sand. They had bailed down 200 feet when the casing seat gave way.

R. W. Rhodes and associates, of El Dorado, have blocked some acreage in Township 19, Range 11, 27 miles southeast of El Dorado, in Union County, Arkansas, and have derrick up for No. 1 Union Saw Mill Co. in the SE cor. NE SW, Section 14-19-11, halfway between Lapile and Felsenthal and the leases call for a 3,000-foot test.

Wildcat completions during the week included W. D. Ball and others' No. 1 Elias Williams, Section 10 7-4, Rapides Parish, dry and abandoned at 2,104 feet without getting any further with plans to deepen it at that level, where it was abandoned originally. Wingfield and others' No. 2 Gibson, Section 2-9-1e, LaSalle Parish, south of Urania production, was dropped from the report as a dry hole at 3,072 feet, where it has been standing since October.

Tidal Enters Mississippi

Tidal Oil Co., of Tulsa, was granted authority February 10 to do business in Mississippi and has sent M. W. Grimm, of Shreveport, a member of its geological staff to Aberdeen to conduct a survey of the situation existing in and around Monroe County as a preliminary to possible drilling activities. Lee County Petroleum Co. has suspended operations on No. 1 Hickman, Section 12-8-6, Lee County, total depth 950 feet. Lauderdale Oil & Gas Co.'s No. 1 Gunn, Section 13-7-16, is drilling rock at 3,148 feet and F. X. Gowans and others have derrick up for No. 1 Simmons in Section 33-8-16, Monroe County.

Humble Oil & Refining Co. has made location 600 feet north and west of SE cor., Section 29-18-5, Bienville Parish, Louisiana, 2 miles south of Arcadia, for No. 1 Anderson and plans a deep test to 4,000 feet. A half dozen or more wells have been drilled in the vicinity of Arcadia during the past three or four years which have revealed favorable structural conditions and two of which showed oil but not in commercial quantities, but none has been drilled as deep as the Humble plans to go.

Several of the major companies have gone in for protection around Bruton and others' No. 1 Red River Farms in Section 2-17-16, Miller County, Arkansas. This territory is within the belt which was so widely explored by Humble Oil & Refining Co. two or three years ago when it drilled 30 or 40 wells, mostly shallow tests through Miller, Lafayette, Columbia and Nevada Counties.

In northeastern Louisiana, Gulf Refining Co. has acquired another large block of 2,000 acres in Townships 22 and 23, Ranges 9 and 10, in Morehouse and West Carroll Parishes. Included in the transaction is a drilling clause calling for a well in 90 days or, in the event the Gulf elects to shoot the tract or make other geophysical surveys, within an additional 90 days, three months being allowed for such survey. The Gulf is one of two or three companies conducting extensive geophysical surveys in Northeast Louisiana there being probably a dozen crews working in that area with seismograph, magnetometer and torsion balance.

NORTH LOUISIANA

Bienville Parish

Edwin J. Forrest and others made a test on No. 1 Perritt, Section 11-17-6, and got salt water with no show of oil or gas from 10 feet of sand at 2,993-3,003 feet and the well is shut down waiting orders. S. P. Borden and others' No. 2 L. & A., Section 1-15-8, remains shut down at 500 feet waiting orders.

Bossier Parish

Doern and others' No. 1 Bollinger, Section 9-22-11, is shut down waiting orders at 3,900 feet, 600 feet under the red bed markers. H. S. Goodwin's No. 2 Curtis, Section 36-17-13, is drilling at 2,110 feet.

Caddo Parish

Greenwood Production Co.'s No. 1 Cooper & Ellerbe, Section 15-18-14, lost several points of drill stem while reaming to bottom at 3,234 feet and is fishing. The Texas Company has started a new well in the wildcat gas area of southeastern Caddo Parish and has derrick up for No. 5 Hutchinson, 840 feet south and 200 east NW cor. SW, Section 15-15-12. Tubbs and others are drilling lime at 2,708 feet in No. 1 Hines, Section 9-14-16, in the far southwestern corner of the parish.

Catahoula Parish

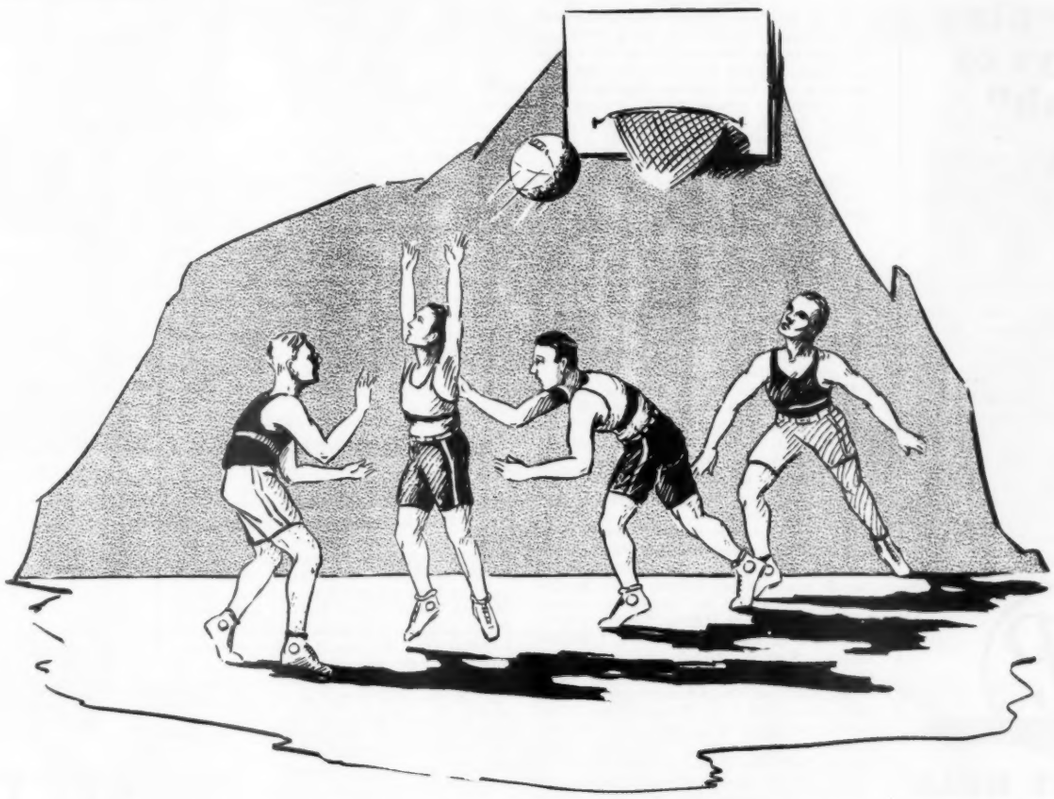
Leonard Petroleum Co. of Washington, Pa., has rig up for No. 1 Knott in the C SW SE. Section 32-11-8. Lochnager Oil & Gas Co. is coring No. 1 Beasley, Section 26-9-6, at 2,000 feet and Standard Oil Co.'s No. 1 Tensas Delta, Section 23-5-5, is on a rock at 3,125 feet. The Texas Company has made location in Section 4-10-6 for No. 1 Tensas Delta Land Co. and will be drilling within 10 days.

Claiborne Parish

Rudesaele and others pulled in the derrick on No. 1 Meadows, an old well, in Section 20-21-7, they are deepening from 2,700 feet, where it was dry, while trying to loosen a stuck drill stem and are shut down at 2,920 feet while a new one is being built.

De Soto Parish

Baca Drilling Co.'s No. 1 Stevens, Section 12-11-16, is shut down at 2,300 feet. Benson Oil Co. is having hard drilling in chalk at 1,923 feet in No. 2 Wolf, Section 3-10-13. Dixie Oil Co.'s No. 1 Jenkins, Section 9-12-11, drilling lime and shale at 6,086 feet, lacks but 4 feet of equaling the deepest well ever drilled in this area. Gulf Refining Co.'s No. 1-C Willis Williams, abandoned in February, 1926, as a salt water hole at 6,090 feet. Foster and others' No. 1 Johnson, Section 7-10-13, 3 miles southwest of Benson Oil Co.'s producer in Section 3-10-13, cored sandy shale at 3,190 feet. The latter was a 40-bbl. producer at 3,008 feet. R. O. Roy has begun drilling No. 1 Whitaker 300 feet north and east SW cor. Section 5-13-13, one of three wells located on a 13,000-acre block in Townships 13 and 14, Range 13, locations for which were made last November. The Texas Company's No. 5 Grand Bayou Planting Co., Section 25-23-12, an old well being deepened from 2,415 feet, is drilling



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BRISK shooting, perfect teamwork, snappy passing marks the practice of each team.

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Slow work marks the opening minutes. Each team is feeling the other out. The advantage seems to be even.

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K-P *Straight Hole* Bits saved $3200.00 *and made the well in 33 drilling days*—but most important, the hole was *straight*—true to gauge—every foot of the way down.

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at 2,425 feet after pulling and sidetracking 6-inch casing cemented at 2,415 feet.

Grant Parish

W. D. Ball and others, who abandoned No. 1 Calhoun in Section 4-7-4 after going back to the abandoned hole and cleaning it out, decided to start from the surface in a new hole and are rigging up for No. 2, 250 feet NW of No. 1. Swope and others' No. 5 Fee, Section 18-9-1e, is drilling at 700 feet.

Natchitoches Parish

Lawson & Pharis' No. 1 Crowell, Section 22-5-6, is drilling sandy shale at 2,586 feet.

Rapides Parish

Collins Brothers have shut down their No. 1 Allen in the town of Tioga, Section 25-5-1w, at 2,200 feet, having made 450 feet of hole during the week.

Red River Parish

Hazelett & Simmons No. 2 Neeley, Section 1-14-12, is shut down at 1,925 feet.

Richland Parish

Gulf Refining Co. is reaming to bottom on No. 1 Millsaps, Section 8-17-6, total depth 2,752 feet, about 300 feet below the gas horizon in proven territory 3 miles south; No. 1 Ches Wymond, Section 20-18-6, is scoring at 2,348 feet. Moody-Seagraves' No. 1 McDonald, Section 9-15-5, cemented 6-inch casing at 2,283 feet; No. 1-B Sartor, Section 9-16-6, is rigging up and No. 1-C Sartor, Section 17-16-6, has rig up ready to drill. Noe & Meredith are drilling No. 1 Boughton, Section 4-15-5, at 1,960 feet. Oliver & Masters' No. 2 Hatch, Section 2-15-5, is drilling at 1,400 feet and No. 1 Margie Hatch, Section 2-15-5, is a derrick. Ouachita Natural Gas Co.'s No. 1 Cummings, Section 24-17-5, cemented 6-inch casing at 2,309 feet. Palmer Corp.'s No. 2 Wayne Land & Timber Co., Section 23-16-5, after plugging back from 2,525 feet to 2,475 feet and bailing without results, is shut down waiting orders. It showed for 250,000 feet of gas at 2,510 feet when bailed by Gulf Refining Co. which then turned it over to the Palmer Corp. pursuant to sale of gas rights on all the Gulf's Richland acreage.

Sabine Parish

S. P. Borden and others have set 12½-inch surface casing at 145 feet on No. 1 Hamlin estate, Section 28-10-13. Doern and others' No. 1 Pickering Lumber Co., Section 17-4-11, is drilling at 1,250 feet. L. M. Emlet's No. 1 Mansfield Lumber Co., now R. L. Gay's No. 1 Mansfield Lumber Co., Section 15-7-14, is rigging up on third hole after skidding derrick 50 feet west of the second hole, junked at 1,250 feet. Awolle Oil Co. No. 7 Bowman-Hicks, formerly L. M. Emlet No. 7 Bowman-Hicks, Section 14-7-14, is still fishing for drill stem testing tool lost at 3,822 feet.

Winn Parish

Ohio Oil Co.'s No. 2 Rolen, Account 1, Section 5-12-1w, is drilling at 4,454 feet. H. M. Roark and others drilled 6⅝-inch plug at 935 feet in No. 3 Southern Minerals Co., Section 19-11-3w, but did not bail.

ARKANSAS

Bradley County

Johnson & Adams' No. 1 Southern Minerals Co., Section 12-12-12, is drilling sandy shale at 2,520 feet.

Clark County

McKenzie Oil Co. bailed down 200 feet on No. 1 Eakin, Section 9-11-9 and casing seat at 646 feet gave way admitting a flow of fresh water; the same result obtained at the same depth in bailing the first hole 50 feet south.

Garland County

H. H. Givan is reported to have shot No. 1 Garrett, Section 1-3-19, in a sand formation at 1,767 feet and again at 1,949 feet and 2,061 feet with a flow of fresh water with a show of oil as the result. He claims he will set 5⅞-inch casing to make a test at 1,767 feet. Total depth of the hole is reported 3,025 feet, at which level it was last reported (November 24, 1927,) as shut down for fuel and more recently for refinancing.

Ouachita County

Little Fay Oil Co. began drilling No. 4 Robertson, Section 25-15-16, February 10, set 10-inch surface string at 65 feet and is drilling at 300 feet. Ohio Oil Co.'s No. 7 Cramer, Section 22-15-16, began drilling February 12, and has 12½-inch casing set at 161 feet.

Pope County

Natural Gas & Fuel Corp.'s No. 1 Wharton, Section 7-8-21, is shut down at 2,950 feet waiting for underreamer.

Union County

W. R. Keever's No. 1 Kavanuagh, Section 12-17-15, is waiting on standard rig to pump with 200 feet of oil in the hole from 4 feet of sand 2,139-43 feet. Lyell and others' No. 1 Stegall, Section 11-17-13, in the old Urbana district, which has been standing since April, 1927, with 12½-inch surface casing set at 47 feet. has been revived and is drilling at 575 feet. Pitcher and others' No. 1 Arkansas Timber Co., in Section 21-17-11, second hole, is temporarily abandoned at 3,107 feet, following a dry drill stem test at 1,766-95 feet with nothing warranting another in the interim. Rhodes and others have made location for No. 1 Union Sawmill Co., 200 feet north and west SE cor. NE SW, Section 14-19-11, and have derrick up.

ROCKY MOUNTAIN AREA

(Continued from Page 55)

2,210 feet. Ferdig-Wyoming Oil Co.'s No. 1 Hough, Section 19-51-100, cemented the 8¼-inch at 2,808 feet. Linco Petroleum Co.'s No. 1 Rosseau, SW cor. NE Section 33-51-100, is drilling at 2,076 feet and the Ostland Development Co.'s No. 1 Rousch, Section 9-51-100, is underreaming to bottom of hole at 2,078 feet. Continental Oil Co.'s No. 1-A State, Section 16-51-101, is still fishing for tools at 1,610 feet. Baston & Darrah's No. 1 Welch, Section 10-50-100, is drilling at 635 feet, and W. T. Ross' No. 1 Beck, Section 28-52-100, is rigging up. Nearby tests include the Ohio Oil Co.'s No. 1 Pulley, Section 27-53-101, Shoshone Structure, drilling at 1,810 feet; Wydoc Oil Co.'s No. 1 Horse Center, Section 6-51-101, drilling at 1,050 feet; and Honolulu Oil Co.'s No. 1 Four Bear, Section 29-48-103, sidetracking at 2,870 feet.

Johnson County

In Johnson County, the Fairway Oil Co.'s No. 1, SE NE Section 7-47-82, on the Crazy Woman's Structure, is reported to have a showng of oil in the second Wall Creek at 2,162 feet. At last reports the 6⅝-inch casing was being run to be set at 2,090 feet.

Two completions were reported in Salt Creek, these being the Wyoming Associated Oil Co.'s No. 31, SE Section 23-40-79, completed at 1,152 feet in the first Wall Creek, but not tested, and the Midwest Oil Co.'s No. 4-L, NW Section 25-40-79, shale well deepened to the Lakota and completed at 2,197 feet with an initial production of 115 barrels.

In Hot Springs County

In the Grass Creek Field the Ohio Oil Co.'s No. 1 Washakie, SW cor. Section 17-46-98, which extended the black oil area in the Embar-Tensleep series about 1,500 feet ahead of production, has been completed at 4,675 feet with an initial production of 100 barrels. The Embar-Tensleep was found at 4,525-675 feet.

Montana

The Baker well on Section 9-34-1, in the Sunburst Field suddenly broke loose last week and went wild. The well has been flowing at the rate of 697 bbls. daily when the control head blew off and started making 3,000 bbls. into the tanks after it has been harnessed again. The flow is steadily increasing and efforts are being made to shut the well in and bean it down.

This well started off as a water well last summer when it was drilled in. After pumping for three months, it started making some oil which increased while the water has decreased. The well is now making oil with very little water. It is owned by a Helena syndicate.

The Pondera deep test that has been fishing for lost tools since last November is now about to clean the hole, according to reports. The last string of lost tools has been hitched with a combination socket and is expected to be jarred loose and brought out within a few days.

In the Sunburst Field, the Hannah Porter Oil Co. is starting a new well on

(Continued on Page 177)

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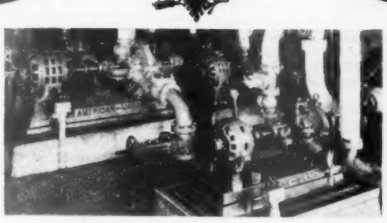

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For immediate shipment from our Texas yards.
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5 Dean Triplex Pumps, 5 by 8.
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Made from 4" O. D. Tubing; weight 5½ lbs. per foot. Material cleaned, cut with plain ends; A-1 in every respect. Located in Louisiana. Special price for quick sale.

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A set of 4½" rig irons, $75.
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MACHINE SHOP — An exceptional opportunity offered high class man, capable full management who has some capital. Fully equipped with best of machinery including pipe threading machine, lathe, first class blacksmithing, and all necessary machinery for oil field work. Located in heart of active oil belt territory in North central Texas on two railroads. Full information upon request. Write or wire Chamber of Commerce, Graham, Texas.

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We have a way of raising it.
We have had considerable experience in selling of securities of high class organizations. We will not consider your proposition if it's questionable or promotional, only those have been established for some time and need additional financing, for expansion purposes and whose earnings warrant additional money to be put in the business.
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Oil and Gas leases or half royalty; some valuable, some cheap, situated in 5-8 Allen Oil Field, Pontotoc Co., 5-8 Chickasha Gas field, Grady County, 5-10 Hughes County, good prospect, 4-14 Atoka County, fair prospect, 5-14 Chocataw County, fair prospect. Also, other valuable stuff not here listed. Can also furnish other at reasonable figures in any county in Oklahoma. Correspondence invited. Box 684, McAlester, Okla.

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Leases and Royalties
W. S. PATTERSON
Pecos, Texas

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LEASES, royalties and drilling blocks bought or sold. West Texas. Wire or write Cope and Fox. 411 San Angelo Nat'l Bank Bldg., San Angelo, Texas.

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HAVE $50,000 cash for good producing royalties preferably Oklahoma, Kansas and Louisiana; settled or semi-settled. Give full particulars. Address Box C-190, The Oil and Gas Journal, Tulsa, Okla.

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WEST TEXAS ROYALTIES
FOR SALE
Of prime consideration is the geological work accompanying each sale.
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ROYALTY: 1/32d or less, whole or part, 1,600 acres in the Pecos country, direct trend from deep test showing large quantities oil at 1,100 feet. Royal buy. $4 base. E. L. STRATTON, Fort Worth, Tex.

FOR SALE—Royalties in Lost Springs oil field, Marion, Co., Kansas. H. R. Hurd, Chase, Kansas.

$50 OR MORE you may own perpetual deeded royalty Pecos, Winkler and other active West Texas counties. Drilling bulletin, title assurance and resale service features of "NATIONAL ROYALTIES." Send your address. National P. & R. Company, Box 1214-B, Wichita Falls, Tex.

WANTED to buy from 25 to 200 Barrels of settled oil production in the shallow oil fields of Texas. Eugene Wilkinson, Nowata, Oklahoma.

FOR SALE, one half of Royalty of 160 acres, or to lease north of Anadarko, give an offer. Louis Seber, Kildare, Okla.

ROYALTIES WANTED. Will pay cash for producing royalties, any size, priced right. Write legal description, number, age, depth, production of wells, full details and price. P. O. Box 1359, Tulsa, Okla.

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OIL & TIMBER LAND
3,500 acres alluvial land with 2,500 feet hardwood per acre in fee, La Salle Parish, edge of Urania Oil Field. Price $7.50 per acre, ¼ cash, balance terms. W. A. Stephens, Realtor, P. O. Box 555, Shreveport, La.

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BARSTOW, TEXAS.

FOR SALE—1,280 Acres good smooth wheat land located in the West part of Deaf Smith County, Texas. Price $15.00 per acre. See us for bargains in West Texas for farm and ranch lands. M. A. Crum, Friona, Texas.

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FOR SUBDIVISION—160 acres near proposed industrial center. Joins Atlanta, Ga., Athletic Club links. East Lake. Box 1682, Miami, Florida.

Furnace Oils Most Active in Chicago

Cold Snap Causes Sudden Demand. Fair Movement of Gasoline Within Narrow Range of Prices

By J. B. Waldo

CHICAGO, Feb. 20.—Furnace oils were the most active item in the market on Monday, while gasoline was rather quiet. This condition was the result of a cold snap commencing on Saturday and still continuing, although warmer Monday. There was a good deal of snow, which will hold back the gasoline consumption for a short time, but dealers continue to report a large gallonage whenever roads permit the free use of autos. There was a fair movement in U. S. Motor gasoline Monday, with a price range of 6⅛ to 6¼ cents, with very little gasoline moving outside of this range. The demand for higher tests is light and prices steady.

Several refiners report some improvement in the movement of kerosene, but this is not general and there was no change in quotations. The larger consumption of furnace oils was felt to some extent in the market Monday, and the demand is expected to increase the next day or two.

Monday's Quotations

Zero gas oils were in best demand, and the dark zero oils were generally held for 2⅞ cents, with some sales made at 3 cents. Distillates were firm, but in less demand than gas oils. Offerings of zero gas oils were light and they were hard to buy in any quantity. Zero fuel oils were also very strongly held and offerings very limited for immediate shipment. Sales of 24-26 fuel oil with a fairly low cold test were made to users at 90 cents and for resale at 85 cents by refiners who had supplies on hand and of heavier gravities at 5 cents less as a rule. The demand for these grades is very largely from the distributors who supply the smaller industries, and the larger buildings and the industries who buy in tank car lots continue to order just as they need the material. Some of the auto plants have been in the market, as they are now beginning to increase their output. The industrial plants as they increase their output to make the spring deliveries should use more fuel oil. On the other hand, winter is so near the end of the season that buyers of oils for heating only will be conservative in their purchases to avoid carrying stocks that they may not need.

Not Much Buying Ahead

The steady if slow advance in refinery prices for U. S. Motor gasoline during all of last week, did not develop any extensive buying by dealers in excess of their immediate wants, so far as a careful check of the market could discover. Occasional buyers purchased a few cars for storage but the number of these buyers was not large nor their purchases important. Gasoline bought now would have to be carried for nearly 90 days before the larger consumption would make a demand for it and the carrying charges would be considerable when everything is charged against the purchase that rightly should be charged. This would be one reason against such buying for early delivery and refiners are unwilling to sell at present prices for shipments over a period of more than 30 days, if that long. It would also tie up considerable capital or use bank credits that might be needed for other purposes. Some dealers do not believe the gasoline market, especially for the U. S. Motor grade, will advance sufficiently to make present purchases profitable. Dealers with marginal contracts are relying on regular shipments and do not want to buy in excess of contract requirements. Refiners argue against the purchasing of supplies in excess of the dealer's actual needs when the additional payments may possibly make the dealer a little slow in meeting his regular accounts.

Collections have been slow but the gradual doing away with cut prices at many points over the territory is improving the dealers' position and making it easier for the dealer in a cut price district to make his business pay him a profit. A great many distributers are just going along with their contracts and when the demand improves with longer days and better roads they will care for their needs. The increase in the refinery prices will be of some value to the refiner aside from the actual returns on the sale of his products. The higher prices will cause the dealer who is under contract with a refiner to take his gasoline as stipulated in the contract and not refuse to give shipping instructions while buying at a lower price in the spot market. This has been one of the great grievances of the refiners and is one of the most powerful influences to cause the refiner to put in his own distribution. It has often been something of a puzzle to many in the industry why refiners, or distributors either, have made marginal contracts of the kind that have been made. Some of the largest quantity buyers of gasoline have never had a contract and they have stated that they saved thousands of dollars on a year's purchases by not having a contract, buying in the spot market.

Unfavorable Weather

Probably the Chicago gasoline market would have shown even greater strength if the weather had been more favorable. Last week it was decidedly unfavorable to the consumption of either gasoline or oils for heating purposes. It was damp, cloudy, chilly with some rain and yet for the greater part of the week the mercury was above the freezing point. The gasoline demand was dragging and buyers hung back and were slow to place their orders. Under such circumstances the upward movement was in a way perfunctory. The spot price for U. S. Motor gasoline hung around 6 cents all week. Two or three refiners at the middle of the week marked up their quotation for the U. S. Motor grade to 6¼ cents and the Sinclair Refining Co. made its price 6½ cents. Several others equally important sold steadily at 6 and 6⅛ cents. Occasionally a sale was made at 5⅞ cents, most of this gasoline being the remnant of orders placed earlier in the month at costs that permitted the seller to make an eighth of a cent gross at that price. It was rather unusual that the higher gravities while firmly held did not share in the upward movement but were simply held all last week at 6½ cents for the 60-62 400 end point and at 7 cents for the 64-66 375 end point.

Ohio and Michigan

The situation in Ohio and parts of Michigan continues to show the advantage which the freight rates give certain refiners. As the price of U. S. Motor gasoline has advanced in the group market the price delivered at Ohio points has advanced in the same proportion. In Cincinnati where dealers bought at the first of the month at 8.20 cents, delivered, the latest quotation was 8.40 from Mississippi River points and from the New Orleans refining district. One refinery at the latter made a lower price but the product is inefrior and is so known. The idea is to make a price just low enough to get the business in competition with Group 3 and pocket the difference in freight rates. It seems to be working very satisfactorily to the refiners at these points and enables these refiners to secure a return of from one-half to a cent more for the same grade of product than their Group 3 competitors. The new freight rates from Group 3 do not change this condition but continue to give the centrally located refiners and those in the New Orleans district a great advantage over the Group 3 refiner. The daily runs of the refineries in the immediate vicinity of Chicago are estimated at less than 100,000 bbls. a day at present and some give figures stated to be correct that show a throughput of 125,000 bbls. All these plants have full cracking capacity and the gasoline output is a high percentage of the oil run. There are in addition a number of small plants operated intermittently when conditions are favorable which really means when the gasoline price is high enough to permit of profitable operation. There are persistent reports that one of the large oil companies of the Mid-Continent Field is seeking a location for a refinery somewhere near this city. One report is they prefer a location at some Mississippi River crossing as they have a large Iowa distribution but recently have increased the number of stations in Wisconsin and Minnesota.

Crude changes have had no apparent affect on the gasoline market unless it be to make the distributors even more uncertain regarding the future and just that much more unwilling to increase their stocks of gasoline. There are several refiners who have held consistently at 6 and 6⅛ cents and lost a lot of business and many customers to other refiners who openly quoted materially lower prices. When these latter refiners suddenly become the leaders in marketing prices upward the managers of the sales offices of those refiners who have refused to meet these extremely low prices are as unwilling to follow the other refiners in the upward movement as they were to meet their cuts in price. They feel that they should have their turn at selling. This may be a rather shortsighted way to look at it but the feeling is natural in the case of the sales manager who has lost hundreds of orders and seen his regular customers give their business to rival concerns because he was holding for a 6-cent price while others were booking business at as much as one-half cent less. If there has been any considerable buying in excess of immediate wants it was of this cut-price gasoline. The consolation that the refiner has who held for a price is that no business at all is really better in the long run than selling at a loss.

Kerosene Slow

Kerosene moved very slowly all of last week and though the season is approaching when the demand will show its usual increase the dealers are not buying in excess of their needs. These needs at present are small. Some buying for export has served to give a better tone to the market than would have been the case. The Texas refiners are holding for higher prices than the same grade of material can be had from other points. The peak kerosene demand for several years has been the latter part of next month and has extended well into May in some season's although as a rule the buying stops as if cut with a knife at the first of May. The prevailing price to the trade was 4¼ cents with a small quantity selling at an eighth of a cent more and perhaps an equal quantity at an equal amount less than the market of 4¼ cents. There is almost no demand for the 42-44 gravity. Many refiners now have as low a flash in their 41-43 product as the regular 42-44 and it was the low flash that made the demand for the higher gravity. One refiner offered a few cars of 42-44 at 4⅝ cents and found the movement slow at that price.

Distillates Disappointing

The movement in distillates has been just fair as compared with previous weeks, but the season as a whole has not been anything like as good as was expected. Some refiners state that their stocks are fairly low for the season and they do not intend to run any quantity from now on. Others have fair supplies. The local distributers have supplied themselves for the present and are out of the market until consumption increases but none are selling as much of the distillates as in previous season. In some cases it is possible their sales are up to or a little ahead of last year to date but the increase in their distillate business is much less at the best than on the heavier furnace oils.

Gas Oil Fair

Gas oil is moving steadily in the zero grades to distributors but the demand is only fair for the straightrun oils. The buying by the gas companies has not been important as their requirements have been less than during an average season. There is some demand from manufacturers but the big business is with the sellers of furnace oils. They want a zero oil, must have it and they also want it in the heavier grade than the regular 32-36 gas oil. The Shreveport refiners have been in this market and were more willing to sell than they were, at the prevailing market. The large demand for the zero straw gas oil seems to be about over. Some dealers still insist on a straw gas oil but their requirements are comparatively small and the tendency is not to quote or offer the straw gas oil. The zero dark gas oil is proving the popular grade and there has been a slight tendency to ask a little higher price. Some sellers have advanced their quotation from 2¾ to 2⅞ cents for a good zero gas oil which is not too dark. The refiners are stating they will hold their straightrun gas oil for cracking and some large purchases are reported by large refiners with cracking equipment that calls for gas oil as their material but these reports have not been confirmed. The quantity mentioned in one of these reports is so huge that it seems to be a great exaggeration and to grow with the telling as do some reports of other matters. Gas oil was bought for cracking by some of the large crackers like The Texas Company, last year, and they are understood to need gas oil and are not unlikely to be in the market when the price is favorable. The gas oil market as a whole has shown considerable strength during the past three weeks and the straightrun product is now held at 2⅝ cents for ordinary quantities and at 2½ cents as the bottom price. For the zero oils the range here is from 2¾ to 3¼ cents but the bulk movement in the dark zero oil is going at a slightly higher cost to the buyer.

Fuel Oil Puzzles

Fuel oil continues to puzzle the trade. The real puzzle is if the higher prices have come to stay. There has been a lot of talk regarding large purchases by the railroads and large takings on old contracts but some real facts do not bear out these reports. The sales managers for a large refinery stated they were offering a railroad customer a chance to cancel a contract which called for a higher price than that at which the road could buy and to make a new contract at the present market. Asked regarding the takings by the roads he stated he knew of nothing important in this way and that it would seem strange under present conditions for the roads to take more than they were obliged to on their old contracts with possibilities of making new agreements on a more favorable basis. The buyer for one railroad said in their case they had not bought nor ordered in more than their usual requirements and he doubted if any railroad had

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East Drawing on the Mid-Continent

Taking Less of Heavy Crudes From Gulf Coast and West Texas. New Contracts With California Producers

By N. O. Fanning

New York Bureau, The Oil and Gas Journal, Room 629, No. 101 Park Avenue, New York, N. Y.

NEW YORK, Feb. 18.—The eastern refined oil markets were unchanged during the week, superficially at least. Under the surface, however, several important developments were taking place, which may have an important bearing on the future of oil prices.

Eastern refiners have begun to draw more heavily on Mid-Continent high grade crude oil and are taking less of the heavier Gulf Coast and West Texas crudes. In addition, it is understood they have placed new contracts with California producers for crude, fuel oil and gasoline, and deliveries have already begun. More than 50,000 bbls. daily of these products combined are involved.

While the ultimate affect of these changes cannot be foretold with exactitude, some factors here look for a firming of the fuel oil market and a softening in gasoline. Stocks of gasoline are so topheavy on the Pacific Coast, it is said here, that until these are absorbed to some extent they represent a menace to the price structure in whatever market they can reach. It is considered probable that the Atlantic Seaboard may be called upon to absorb a large part of this apparent surplus. On the other hand, California producers have been extremely hesitant about selling fuel oil for delivery to the Atlantic Seaboard at all, and will only do so at their own price. This would mean a higher level for Atlantic Coast fuel oil than now exists, if California fuel oil is to be sold here at a profit.

The markets here that will probably be least affected by the changes which are in view are those for lubricating oils, wax and kindred products.

The expert outlook on the seaboard is unchanged and in all probability no relief to the domestic situation can be looked for from that source.

Gasoline

Gasoline is generally unchanged in the East, but there is an undertone of weakness evident in liberal offerings of 54-56 gravity Mid-Continent material and natural gasoline, principally from the same direction. U. S. Motor grade is quoted here at 8¼ cents in tank car lots at seaboard refineries, although some factors claim they can get it for as low as 8 cents. This cannot be confirmed.

The weather has reverted to warmth with an average temperature for the last few days of 40 degrees Fahrenheit, which is certainly unseasonable and more suggestive of spring than winter. Any weakness in the gasoline market here cannot be attributed to consumption. Motoring has been at a record rate all winter and the "open winter" covering at least southern New York State, all of New Jersey and eastern Pennsylvania, involving the big metropolitan districts of the East, should have been a strengthening influence. An offsetting influence, however, which cannot be overlooked, is the heavy snows in northern New York, as far south as the Mohawk Valley in which many of the state's big cities are located, and also the slump in consumption in parts of the South, due to reaction from the boom years of 1924 and 1925.

The chief point of weakness in the market seems to be the attitude of refiners here of meeting all competition in the market, but this can be traced in turn to their own statistical situation, cheap crude and other contributing factors. Present price levels along the Atlantic Seaboard practically prohibit tank car shipments of Mid-Continent material into this territory at a profit, and yet the continued inroads of gasoline from that source indicate a "distress" condition. So long as this condition exists, little improvement here can be looked for.

The tank wagon gasoline situation on the Atlantic Coast is unchanged. It is believed, however, that the law of supply and demand is gradually working to squeeze out some of the least economically situated factors. The building of new service stations is quite noticeably on the decline. There has been a marked degree of change in ownership of present outlets, involving also changes in brands of gasoline carried. This evolution is believed to involve the movement of retail outlets into strong hands.

Kerosene Unchanged

The kerosene market continues unchanged, with water white quoted at 7½ cents a gallon in tank cars at seaboard refineries, and prime white at 6½ cents. No development is reported indicating a change in the situation for the time being. The present tone of the market is steady, however, and if any change in the situation does occur, it should be for the better.

The tank wagon situation, so far as kerosene is concerned, has been steady for so long and the consumption has shown little variation that there has been little thought of any change one way or the other.

Gas Oil

The gas oil market is steady, with 28 plus quoted at 5½ cents a gallon, unchanged, in tank car lots. The market is extremely narrow, as it has been for some time. The only factor that might affect the domestic market to any degree would be a disposition on the part of refiners to increase their "cracking operations", and there is no indication of this at present. The present movement involves 28-30 gas oil. Little is doing in 32-34 gravity and it is likely refiners are not anxious to sell this material, any way, because of its gasoline content.

Fuel Oil

Increased receipts of California fuel oil on the Atlantic Seaboard are the feature of the fuel oil markets here, which are steady. While competition in the market for both Diesel oil and bunker fuel oil is greater, prices are steady, and it is not likely, in view of the low levels at which these products have been selling, that any lower prices will be seen. The market is believed to have discounted all the unfavorable factors to date.

There is evidence in some quarters of a scarcity of spot fuel oil. While indications point to an increase in the California movement, it is believed that this is costing somewhat more than the material which has been coming in from other sources. This increase may be passed on to the consumer in the near future, unless offsetting developments occur.

California fuel oil, which is apparently available in carload lots for not less than 85 cents a barrel, would cost approximately 55 cents to ship to north Atlantic ports, making a total of $1.40 a barrel, not including handling costs. This compares with a current quotation of $1.35 here at present.

Venezuelan fuel oil, on the other hand, is understood to be available at around $1.20 to $1.25.

Lubricating Oils

The lubricating oil market on the Atlantic Coast has been drifting along ever since the first of the year without any particular change, and to all appearances will continue that way for some time yet. While the demand has been much better in recent weeks, the supply has also been more liberal, which can probably be traced in part to a more limited export movement.

There is still a great deal of competition in the lubricating oil market, as a result of the entrance of new interests in this field, the introduction of South Texas lubs on a bigger scale, and other shifts, which have on the whole made it seem remarkable that prices have held so well. Lubricant manufacturers are unanimous in saying that there are a great deal too many retail outlets, so that all in all, the steadiness of the market can be even more appreciated.

About the only grades of lubricants now showing any weakness whatever are steam cylinder oils and spindle oils, the demand for which seems to be just a little below normal. Texas red and pale oils, on the other hand, are a little more active.

Paraffin Wax

Paraffin wax is steady and prices have been unchanged. Some jobbers are holding out for one-eighth of a cent a pound more on 130-132 and 135-137 than the prevailing market, but 4¾ and 5½ cents, respectively, for these grades are still the ruling quotations.

Petrolatum

The petrolatum market is rather dull and unchanged. Dark green is the most active grade at present. Amber and extra amber are also moving briskly. These grades, however, represent the extent of the activity.

Export Market

The oil export situation generally is rather unsatisfactory, with the actual movement restricted and future business scarce. A further drop in domestic fuel oil prices in England took place during the week. Industrial fuel oil and Diesel oil were cut 2s 6d per ton. Bunker fuel oil remains unchanged.

The bulk export market here was unusually dull during the week. Activity continued in the cased oil department, however. South America was the largest buyer of both gasoline and kerosene in cases.

The paraffin wax export movement was saved by a large consignment (over 2,000,000 pounds) destined for Italian ports. This was the first big wax order for several weeks. It involved fully refined wax.

The following table shows principal exports of petroleum and petroleum products from New York during the last three weeks; (all figures in gallons unless otherwise noted):

	Week Ended		
	Feb. 15	Feb. 8	Feb. 1
Gasoline:			
Bulk	.....	.....	4,515,000
Cases	1,105,000	1,540,210	175,240
Kerosene:			
Bulk	.....	.....	2,767,800
Cases	2,049,440	3,284,220	989,730
Fuel oil:			
Bulk	.....	.....	2,618,932
Lubricating oil:			
Bulk	.....	613,662	4,318,797
Bbls.	246,930	559,250	424,680
Cases	116,410	75,480	56,900
Paraffin wax:			
Bags (lbs.)	2,472,140	471,020	588,720
Bbls. (lbs.)	.....	112,000	1,149,960
Petroleum asphalt:			
Bbls. (tons)	210	.....	.....

The foregoing figures include all shipments of 500 bbls., 1,000 cases, or over.

Tanker Market and Movement

The oil tanker market is considerably more active, but rates have not improved. A 10,000-ton deadweight Diesel-driven tanker, built on the Clyde, has just been sold to Norwegian owners to carry out a 10-year charter in the oil trade. The purchase price is payable over the same period as the time charter, so that the vessel will actually pay for itself out of the profits on the charter. Norwegian owners have specialized in long term charters of recent years, in some cases having vessels built for the purpose of carrying out such charters.

New charter fixtures include the following:

Tanker Masconomo, 6,000 tons, delivery May-June, crude, 12 months, 5s, 3d.

Tanker Canopus, 4,000 tons, Black Sea to Fiume, clean, 12s 3d, February loading.

Tanker Aragaz, French Atlantic from Gulf, 16s 3d, north of Hatteras, 14s 9d, from Constanza, 13s 9d, March-April loading.

Tanker Chester Sun, Gulf to New York, rate not given.

Cargo ship Buchanness, 160,000 cases oil, Gulf to seven Australian ports, 34 cents, February-March loading.

Tanker Conrad Mohr, clean, Helsingfors from Gulf, 20s, from North Hatteras, 23s, April loading.

Tanker Amolco, fuel oil, Gulf to Banes, 33 cents.

Tanker Malistan, clean, five months charter, 5s.

Tanker Vitruvia, clean, Tampico to Rouen, 18s 6d, April loading.

Tanker Lincoln Ellsworth, clean, Black Sea to Hamburg, 13s 3d.

The movement of oil to the Atlantic Seaboard during the week ended February 15 reached a low ebb, totaling only 2,730,000 bbls., a daily average of 390,000 bbls. This was due to extremely small receipts from the Gulf Coast. The latter have been declining steadily.

The receipts from the Gulf Coast for the week amounted to 1,427,000 bbls., a daily average of 204,000 bbls., against 2,500,000 bbls., or 357,000 bbls. daily the preceding week.

Receipts from the Pacific Coast, on the other hand, are increasing, the total for the week ended February 15 being 579,000 bbls., a daily average of 83,000 bbls., compared with 297,000 bbls., or 42,000 bbls. for the week ended February 8.

Imports amounted to 724,000 bbls., a daily average of 103,000 bbls., of which South America accounted for 541,000 bbls., a daily average of 77,000, and Mexico for 183,000 bbls., a daily average of 26,000 bbls.

The following table shows estimated daily average receipts of crude and refined oil by water at Atlantic Coast ports for the last three weeks; also monthly record for the last 12 months (figures in barrels):

	Week Ended		
	Feb. 15	Feb. 8	Feb. 1
Gulf Coast	204,000	357,000	424,000
Pacific Coast	83,000	42,000	12,000
South America	77,000	164,000	157,000
Mexico	26,000	.....	32,000
Total	390,000	563,000	625,000

Daily Average by Months

	Gulf	Pacific	Amer.	Mex.	Total
1928—					
Jan.	340,000	48,000	137,000	27,000	552,000
1927—					
Dec.	345,000	68,000	146,000	37,000	596,000
Nov.	318,000	42,000	109,000	42,000	531,000
Oct.	314,000	98,000	91,000	38,000	541,000
Sept.	336,000	97,000	99,000	69,000	601,000
Aug.	397,000	90,000	78,000	80,000	645,000
July	406,000	82,000	49,000	78,000	616,000
June	378,000	118,000	47,000	68,000	611,000
May	332,000	58,000	53,000	91,000	534,000
April	388,000	93,000	61,000	69,000	611,000
Mar.	345,000	102,000	81,000	36,000	565,000
Feb.	379,000	89,000	48,000	40,000	556,000

The foregoing figures are based on the carrying capacity of incoming oil laden tankers.

COMPREHENSIVE MAP

FORT WORTH, Tex., Feb. 20.—The Oil City Map Co. has just completed a general map of the Mid-Continent Fields. In addition to showing all of the oil and gas fields at present producing, the map shows all of the main-line gas systems. In addition to that, the major fault lines are shown. The map is made up on cloth, with the oil and gas fields in color.

Explosion in High Pressure Chambers

Experiments Tend to Show Little Danger From Gas in Air Chamber on Line Pumps With Crude and Refined Products

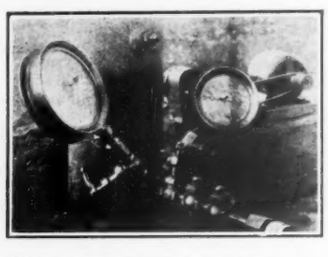
RESEARCH REPORT

The Goulds Pumps, Inc., during the past two years has been carrying on research work relative to the possibilities of explosions in high-pressure air chambers. Little data regarding this problem which is of special significance to those interested in the pipe line transportation of crude oil and refined products, have been available in the past.

In the accompanying article a summary of the findings in the Goulds' experimental work is given.

A small section of air chamber virtually a bomb as shown in the accompanying photographs was constructed. Means were provided for measuring the pressure both with gauges and with special hydraulic indicator operating on a drum. When the work was first started care was taken, every test being made with an explosion mat over the chamber and the apparatus shown directly back of the chamber was kept at a considerable distance. As the work went along pressures observed were so safe that compressor and ignition device were moved in close to the air chamber for convenience.

A chamber about 30 feet long and 10 feet extra heavy hydraulic pipe approximately three-quarters of an inch thick was constructed. In this air chamber two special spark plugs as shown were installed. A Bosch magneto giving three sparks per revolution was motor driven at 2,000 revolutions so that 6,000 sparks were obtained on each spark plug per minute; as a matter of fact, these spark plugs threw a stream of fire and in the open air a piece of paper put between the points would immediately burst into flame. A very considerable number of tests were made with various grades of crude oil as well as kerosene. Under no condition, with these liquids could the slightest indication of an explosion be obtained.



View of apparatus used in making test

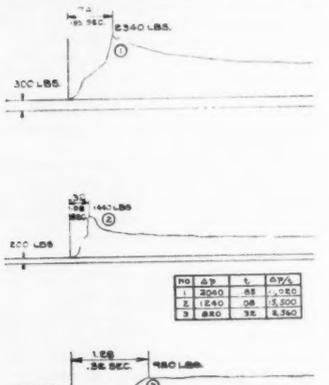


Figure 1—Explosion pressures in experimental air chamber. Liquid in air chamber—gasoline.

A shift to gasoline was then made and it was found that combustion would occur at 100, 200 and 300 pounds pressure; below 100 and over 300 pounds under no condition was it possible to get any sign of burning. This work was done with a chamber temperature of about 90 to 95 degrees Fahrenheit, the air was pumped in as rapidly as possible in the bottom of the chamber and allowed to bubble up through the liquid. Various levels of liquid were used and apparently had little, if any, effect on the possibilities of combustion, the results with gasoline being about the same with 1 to 6 inches of gasoline in the chamber. The average results of these tests so far as pressure is concerned are shown in Figure 1. The analysis of the gas in the chamber both before and after explosion is shown in Table 1.

Charging Air

A number of installations for charging air as shown in Figure 2 were then made. This has been quite a satisfactory rig, the method of operation is to open drain valve (12), turn on the air supply partially to blow any liquid out of chamber (8), then close the drain valve and let the air pressure build up to the maximum available in chamber (8); oil supply valve (11) connected to the pumping system is then opened and full line pressure is put on chamber (8), the air in this chamber, of course, being compressed up to the line pressure. To charge the air chamber valve (9) is opened and the difference in level between the two chambers causes discharge of air from chamber (8) into chamber (9); when the desired level is reached in air chamber (1) valve (9) is, of course, closed off. There was never any sign of heating in tank (8) and the rig has worked out very well where there is 250 pounds air available for starting the engines with line pressures of about 700 to 800 pounds. Figure 3 is a chart taken from a German text book giving the range of explosive mixtures with various materials and it would appear that the possibility of an explosive mixture in the air chamber is rather remote and the possibility of igniting is still more so.

It is apparent that there would be nothing serious about such an explosion should it occur in a well-designed air chamber. As shown in Figure 1 the time of building up pressure is comparatively long so that in the event of an explosion excess pressure would probably be very largely used up by forcing liquid out of the air chamber.

This company has done a certain amount of work investigating surges in pipe lines and Figure 4 shows some typical results of the system we experimented with at our plant. It will be noted that the surge pressure increases that readily can obtain in a pumping system without an air chamber give much more rapid pressure changes than explosion pressures that we were able to obtain.

These data will be of interest as it tends to show very conclusively that the possibility of trouble due to explosion of gases in an air chamber on a line pump are so remote as to be negligible.

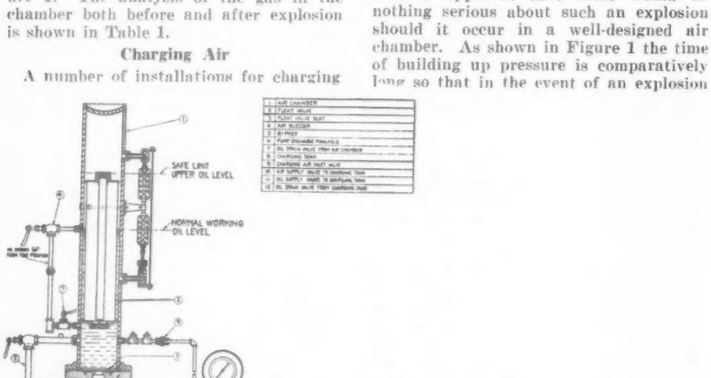


Figure 2—Installation for charging air

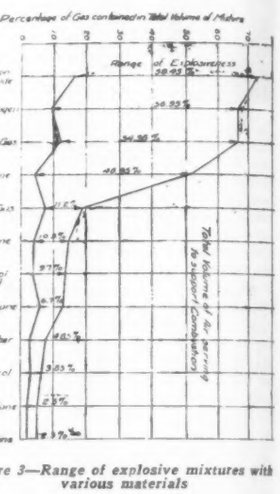


Figure 3—Range of explosive mixtures with various materials

Sample—	CO_2	O_2	CO	H_2	Max. Pres. Explosion Lbs.
100 lbs. before.	0	20.0	....	....	...
100 lbs. after..	3.0	4.3	8.8	5.1	920
200 lbs. before.	...	21.0	....	....	...
200 lbs. after .	8.0	.3	8.9	8.7	1,440
300 lbs. before.	...	21.0	....	....	...
300 lbs. after .	4.2	.5	6.7	7.8	2,340
400 lbs. before.	...	21.0	....	....	...
400 lbs. after..	.1	20.3	....	.8	...
500 lbs. before.	...	20.6	....	....	...
500 lbs. after..	...	Broken tube	....	....	...
600 lbs. before.	...	21.0	....	....	...
600 lbs. after..	...	20.4	....	....	...

Table 1—Gas in chamber before and after explosion. Results of Professor Diederichs' experiments as to possibility of explosion in air chambers. With gasoline there are explosion at 100, 200 and 300 pounds, none at 400, 500 or 600, the explanation being that above 300 pounds the mixture is too lean to explode.

Pressure condition discharge line at pump main air chamber. Valve closed, bypass slightly open. Special single cylinder, 4 by 12 pump, 1,117 4/10-foot discharge line.

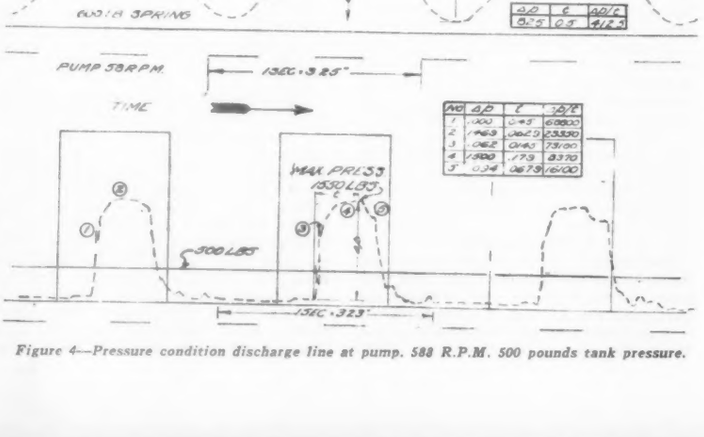


Figure 4—Pressure condition discharge line at pump. 588 R.P.M. 500 pounds tank pressure.

TO BUILD MIDLAND LINE

Contract for laying a pipe line to bring natural gas from the Panhandle Field to Midland, in West Texas has been let to the John W. Moore Construction Co. Surveyors are already at work. Natural gas will be available for use in Midland by July 1, according to W. W. Graves, assistant manager of the West Texas Gas Co., which owns the franchise. Crews will be in Midland to lay mains and laterals in April. The gas line to Midland will be an extension of the line from Amarillo to Lubbock. It will serve Tahoka, O'Donnell and Lamesa en route to Midland. The West Texas Gas Co., a subsidiary of the Prairie Oil & Gas Co., will have headquarters at Midland.

GAS STRIKE IN NORTH DAKOTA?

A gas strike is reported on the farm of Al Marchek, near Charbonena, N. Dak., at a depth of 200 feet. Experts are now on their way to the well to identify the gas and to examine the vicinity for indications of a structure. Charboneau is in the western part of McKenzie County and the strike was made in the northwest part of the county.

FURNACE OILS MOST ACTIVE IN CHICAGO

(Continued from Page 174)

done so unless it was a very low-priced fuel. In a general way it is stated the roads are contracting or are able to contract at 85 to 90 cents, depending very largely on the section of the road, with advances or declines of 60 per cent of change in the price of the crude.

The cuts in the low gravity crude has not had any real influence here except that some of the buyers are a little slower than they were if possible, in placing their orders. The buying by the industries has not shown more than a slight increase. Generally January and February to date were better months than December. The sales manager for a Group 3 refinery when asked regarding railroad business stated that he knew of nothing special and said that in their case their December business was bad and that in January they just went out and sold and secured enough orders to take care of their output up to the latter part of February and he thought that other refiners had done the same. There must come a time when with reduced production and continued consumption at a very fair level, the demand will catch up with and pass the supply.

Divergent Opinions

One of the heads of a very large selling organization returned from Tulsa late last week and said emphatically that the oil was not to be had. He did not know why it was but the fuel oil could not be bought at anything like recent quotations and in his opinion these new prices would hold Others do not agree with him but they base their opinions very largely on the belief that large supplies of fuel oil will be available from other sources than the Group. They seem to favor the idea that a lot of fuel oil will come from West Texas. There is a lot of oil there but is it usable and will the Chicago buyers take kindly to it? So far they have not been very favorably impressed. Some of the Borger fuel oil was received by a local buyer and he telephoned the seller to come out and help unload the car and advised him "to bring an axe for nothing else would get the oil out of the tank," and they did not have a heavy axe on the plant. Some of the West Texas crude received here has been very definitely rejected by the oil firms to whom it had been shipped for sale and there is a pleasant joke about the health authorities insisting that the crude be returned to Texas, as that was the only part of the country where the public would stand for the smell.

The fuel oil demand here is still hesitating and buyers are purchasing only what they actually need for the most part. Some of the purchasing agents would like to fill up some of their storage but the management of many of the large concerns are refusing to permit any extra buying. It was thought that the lower freight rate, amounting to 3 cents a barrel from the Group, might cause some of the orders to be held back until March 2, but in most cases the concerns need the oil at once and cannot wait. The industrial situation, especially with the large concerns, has improved somewhat since the first of the year and they are taking more fuel oil although the way in which they are purchasing, in small quantities and from different sources where they can buy at the lowest price, makes the demand seem rather less than it really is. The zero oils are being held for substantial premiums over the ordinary cold tests but they are very hard to buy at any price as those that have supplies are holding them for their own needs. The market has advanced for the ordinary grades during the week and the tendency is still upward in spite of the nature of the demand and lower prices made on what are primarily fuel crudes. Undoubtedly the reduction in these crudes, while not general by any means, has caused a certain amount of hesitation and caused some buyers to defer their purchases. There is a very keen search being made by dealers and consumers alike for low-priced material and it is not improbable that some products that are new to this market will be offered here, such as the McCamey fuel oil and similar fuels. The Smackover crude is still a scarce article in this market. Some of the refinery fuel oil from plants operating on Smackover crude is offered at prices around 85 cents while the crude fuel is being offered at 95 cents to $1.

Lub Market

A buyer of lubricating oils stated last week that in response to an inquiry for a price on a car of Pennsylvania bright stock he received the lowest quotation that he remembered to have ever been made him on this oil, namely 26½ cents with a range of prices extending upwards to 29 cents. There is an evident desire to sell bright stocks as prices were being wired without solicitation by some of the Group 3 refiners and at the same time prices were made by nearer sources for the grade of oil f.o.b. Chicago quoted for the Oklahoma product f.o.b. Group 3. This gave the market an appearance of being knocked about to some extent. The demand for all grades of lubricating oils was rather light, little change being noted and refiners who had business booked ahead were considered fortunate. The jobbing demand for motor oils is not active and the industrial demand is only fair.

Tank Wagons

There has been no change of any importance in the tank wagon situation. The scale is being restored in many of the localities where reduced prices have prevailed.

START OPERATING NEW SAN ANTONIO REFINERY

HOUSTON, Tex., Feb. 20.—Humble Oil & Refining Co. has completed its new plant at San Antonio, Tex. The plant is handling approximately 5,000 bbls of crude oil daily, its rated capacity. This is the second plant the company has completed and put in operation in the past few months, both being operated on West Texas crude. The first plant, a 12,000-bbl. refinery at McCamey in Upton County, was shut down for a week early in February following a fire which destroyed a part of the treating plant, a run down tank and several storage tanks.

Humble has started construction of another 10,000-bbl. refinery at Ingleside (Corpus Christi) but at present all work has been suspended. The latter refinery will not be completed if the Humble Pipe Line Co. is not permitted by the state to build deep water loading racks in the Gulf of Mexico off from the Ingleside terminal.

The Humble Pipe Line Co.'s case still is pending in the Third Court of Civil Appeals at Austin, where the company appealed from a temporary injunction granted the state prohibiting the company from laying a pipeline across Corpus Christi bay from the Ingelside terminal and proposed refinery to deep water loading racks. The case itself does not involve the Humble's refinery but the company will have no need to build a refinery at Ingleside if it can not load boats there, which it cannot do to capacity in the present shallow water channel.

FIELD MEN IN WINKLER COUNTY HOLD MEETING

(Continued from Page 39)

field committeemen and the others are expected to sign in a few days.

The regulations have been forwarded to Mr. Parker at Austin by Mr. Horehouse.

The resolutions adopted regarding setting and cement of casing follows:

Surface Pipe

Casing of a diameter not less than 12½ inches should be set and cemented for a surface string. The seat for this casing should be carried not less than 6 feet in the Barstow sand stone. Where this sand stone is encountered 300 feet or above it is recommended that 150 sacks of cement be used for 12½-inch casing and an additional sack per foot for depths below 300 feet. Where 15½-inch casing is used it is recommended that 300 sacks of cement be used and 2 sacks per foot of additional hole.

Oil Strings

Due to multiple pay conditions known to exist in the field, it is recommended that a minimum size 8¼-inch casing be set. Where gas is known to be absent above the big lime the casing should be carried well into the lime, but in areas where the gas is found at the contact of the lime and the anhydrite it is recommended that this string be set in the hard anhydrite immediately above the gas, attempting as far as possible to case off the last salt stratum found just above the hard streak of anhydrite on top of the lime. If the operator encounters this gas before casing has been set, it is recommended that he drill as much as 30 feet below this stratum before cementing casing, and use sufficient mud to kill gas before cementing.

It is recommended that the above string be cemented from its seat to the seat of the surface casing. For 8¼-inch casing in an 11-inch hole use .294 sack of cement per foot; for 8⅝-inch casing in 11-inch hole use .225 sack per foot; for 9⅞-inch casing in 14¾-inch hole use .695 sack per foot; for 10-inch casing in 14¾-inch hole use .667 sack per foot.

Inner Strings

In view of the multiple pay conditions and present water situation in the field it is recommended, for the mutual benefit of all concerned, that in drilling into the lime the hole be reduced below the first oil pay in order that the second string of pipe can be set on this shoulder in the event of water encroachment from the upper pay. If the operator desires to case below the second pay it is recommended that a packer be run on the pipe between the first and second pay, insuring a shut off from any water filtration between these pays.

It is not recommended at this time that any gas strata be cemented off, as it is very certain that they will produce oil. However, if the operator wishes to case off water with one or more porous strata producing oil or gas, it is recommended that this string of pipe be cemented.

NOAH F. CLARK DIES; ORGANIZED SOUTH PENN

Noah F. Clark, aged 73 years, former president and general manager of the South Penn Oil Co. in Oil City, and recently president of the Omar Oil Co., died at the Mayo Brothers Hospital in Rochester, Minn., on Sunday morning following an operation of several weeks ago. The deceased left here 25 years ago, removing to Pittsburgh where he has since resided.

Noah F. Clark has been an active figure in the oil industry for many years, his first connection with the business being in Oil City. After two years' experience he became the purchasing agent for Scofield, Shurmer and Teagle, Cleveland refiners with offices in Oil City. He continued in this capacity for five years and then became a producer, being interested for a time with Munhall and Smithman. At the opening of the Bradford Field he went into producing properties there. Later the firm of Clark & Foster took an active part in the Warren County oil development, Mr. Clark being manager. This firm opened the field in Elk County and was prominent in the Kane Field in McKean County. Mr. Clark was also a member of the Oil City Oil Exchange during its exciting years.

In 1889 Mr. Clark organized the South Penn Oil Co., which took over all the Clark & Foster interests in producing properties. He was vice president and manager, afterward becoming president of the company for five years. He resigned his office and withdrew from the South Penn Oil Co. about 1901, and since that time has been engaged in the producing of oil and gas on his own account.

ROCKY MOUNTAIN AREA

(Continued from Page 170)

Section 18-34-1, near the two large wells of this firm, and the Madeline Oil Co.'s test on Section 33-35-4 is about at the Ellis sand and will be a completion by next week. The Zenith McDonald wildcat north of the field, which was drilled to 2,180 feet, is being abandoned and plugged.

Many leases are starting up in the Sunburst Field after the winter's shut down, just at this time the field is experiencing excellent weather conditions and all signs point to an early spring. The oil operators are starting up work accordingly.

In Section 10-37-5, northeast of the Sunburst Field and near the Canadian border in the Sweetgrass hills, the Sunburst Oil & Refining Co.'s test is 3,000 feet deep and close to the Madison contact where the sand Ellis sand is expected.

ROCKY MOUNTAIN PRODUCTION

Runs From the Field	
Wyoming	
Salt Creek	38,530
Big Muddy	2,740
Grass Creek	2,500
Elk Basin	1,140
Greybull	10
Dutton Creek	....
Rock River	2,740
Lance Creek	650
LaBarge	830
Mule Creek	....
Poison Spider	200
Hamilton	1,220
Osage	260
Lander	750
Ferris	30
Byron	40
Lost Soldier	2,770
Simpson Ridge	10
Total Wyoming	54,420
Montana	
Cat Creek	1,810
Lake Basin	150
Kevin-Sunburst	8,500
Total Montana	10,460
Colorado	
Florence	1,079
Moffat	1,320
Fort Collins	3,021
Iles Dome	1,536
Rangely	100
Tow Creek	412
Boulder	25
Total Colorado	7,483
New Mexico	
Rattlesnake	....
Hogback	530
Cap Rock	231
Table Mesa	347
Artesia	1,268
Total New Mexico	2,376
Total Rocky Mountain	74,739

STEADY MOVEMENT IN GULF COAST NEUTRALS

HOUSTON, Tex., Feb. 20.—Considering February being the dullest month of the year for new business movement of Gulf Coast neutral oils continued favorable the past week. Market prices Monday still were steady and indications were that the price structure would suffer no more, weakening the remainder of the month. The chief volume of business so far this month has been in trade marked lubricating oils with one seller having a greater November this month than during January. Some export inquiries continued to come in for smaller amounts of material but sellers now are relying mostly on domestic sales fuel oils and gas oil continued stationary and both products were virtually out of the market as far as Gulf Coast materials were concerned.

VENANGO PRODUCERS PROTEST ASSESSMENT

OIL CITY, Pa., Feb. 18.—A vigorous protest against the tax assessment on oil producing property whereby the valuation is fixed at an amount equal to $1,000 for each barrel of oil produced was voiced by a delegation of 50 oil producers at a conference held with the Venango County commissioners.

Three years ago the valuation was increased from $500 to $1,000 a barrel. At that time oil producers appealed, but the appeal was not granted.

The producers at this week's conference appeared and urged the commissioners to reduce the valuation to at least $500 a barrel. Brief addresses were made by David B. McCalmont, E. C. Breene, John L. Nesbit and John L. McBride, who declared the present basis makes the taxes on oil producing property a burden. With the constantly increasing cost of operating oil leases and unsatisfactory market conditions, they declared, the oil producers are now losing money.

Brief Items for Petroleum Refiners

A.O.B.A. to Have Varied Program at Chicago Meeting

Plans for co-operation by the oil producers and the electric light and power companies in serving the users of oil heating apparatus will be one of the important topics discussed at the fifth annual convention of the American Oil Burner Association to be held at the Hotel Stevens in Chicago on April 3, 4 and 5. A representative of one of the large electrical companies will speak on the relation of the central station to the oil heating industry and the interest of the oil producers in the utilization of oil fuel by owners of homes and commercial buildings will be discussed by an official of one of the large oil companies, whose name has not yet been announced.

One of the features of the convention will be the showing of the Bureau of Mines motion picture, "The Story of Petroleum." There will be two sessions for manufacturers devoted respectively to engineering problems and organization and management problems, and two dealers' sessions, one devoted to organization and management and the other to sales and service. Edward James Cattell will be the principal speaker at the annual dinner to be held on the evening of April 4.

Leod D. Becker, managing director of the Association and the Oil Heating Institute, will present his annual report, a feature of which will be the educational program being carried on by the Institute.

Among the subjects on the program are, "Why We Have General Trade Practices,' "Are We Making Progress in Fundamental Engineering," "Installation Regulations and Other Factors in the Cost of Installed Equipment," "What Competition May We Expect from Other Fuels," "Organizing a Sales Force," "The Selection and Training of Dealers," "The Manufacturer and Service," "The Importance of a Complete Line of Equipment," "The Relation of the Indirect Heater to Oil Burners in the Heating of Domestic Water," "Automatic Oil Heating Service as Distinguished from the Oil Burner for Sale, "CO_2 and Its Relation to Burner Adjustment," "What Price Service."

In connection with the convention there will be an exposition illustrating the development of the oil burner equipment with displays of everything entering into the manufacture, installation and use of oil burners.

MICHIGAN ASSOCIATION MAY ALTER ITS TITLE

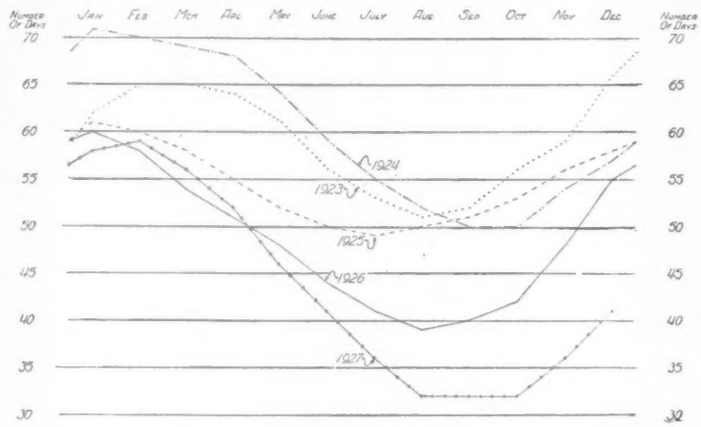
CHICAGO, Feb. 18.—At the recent meeting of the Michigan Independent Oil Men's Association a committee of three was appointed to consider the proposition made at the meeting to drop the word "Independent" from the title of the organization. The statement was made that the word independent has become misleading. So many of the oil companies realize that the designation no longer adequately describes their business.

Some of the larger refining organizations with distribution in the State cannot be listed as independent in the former meaning of the term. It was also stated that the problems of the oil industry required the aid of all concerns for their best solution and that the dropping of the word from the Association's title would broaden the organization and make it possible to secure representation in its ranks from all distributors in the State, no matter what their connection with refineries might be.

GASOLINE STOCKS BASED ON DAYS SUPPLY ARE EXCEPTIONALLY LOW

Gasoline stocks at refineries at the beginning of 1928 based on days supply were far less than on the same date of the four previous years. The preliminary report of the Bureau of Mines covering refinery operations in 1927 which was released during the past week showed that gasoline stocks at refineries in the United States on January 1, 1928, totaled 32,323,000 bbls. This was a decrease of 6,700,000 under the total for the same date in 1927.

This volume decrease in stocks is of special significance when the fact that gasoline consumption based on refinery shipments is running about 10 per cent greater in 1928 than it was in 1927 is considered. The statistical department of the Western Petroleum Refiners Association prepared the accompanying chart to show graphically this relative situation as to days' supply of gasoline for the past five years.



Days' supply of gasoline at United States refineries. (Based on average shipments during immediately succeeding months.)

It will be noted that there has been a general trend to reduce gasoline stocks at refineries based on days supply since 1924. This trend was especially marked the last nine months of 1926 and 1927. The chart shows that since April, 1927, the days supply has been less than for the same period in 1926. During August, September and October of last year refiners had only 32 days' supply on hand. During the same period in 1923, 1924 and 1925 the refiners had from 50 to 52 days on hand.

When 1927 ended the days supply had increased to 41 days. This compared with 55 to 60 days' supply on January 1 of 1925, 1926 and 1927 and almost 70 days on January 1, 1924. These data reflect a situation in which the refiners have decided that the carrying of large stocks of gasoline was an unnecessary burden which oftenttimes becomes an unfavorable market factor.

The relatively small stocks on hand at the beginning is interpreted as a favorable factor in the present gasoline market situation. Gasoline prices are low, reflecting the general overproduction of crude oil. The low gasoline stocks, if they are continued through the remainder of the winter and spring months, should enable the refiners to take advantage quickly of any improvement in the crude oil situation.

ADVISES AGAINST ASKING DOCTOR EGLOFF AS TO WHAT TIME IT IS

The suit of the Universal Oil Products Co. against the Standard Oil Co. of Indiana which has been in the courts since 1913 involving the alleged infringements of the Universal's patents by the Standard in the operation of the Burton cracking process has apparently established another record. Dr. Gustav Egloff of the research department of the Universal company who went on the stand last November is still giving testimony according to advices from St. Louis.

Several hundred pages of testimony had already been given in the case when the case was reopened to take depositions at St. Louis. Doctor Egloff was the first and up to the present time the only witness.

His long stay on the stand recently has attracted the attention of the St. Louis newspapers and during the past week the Post-Dispatch of that city commented editorially as follows regarding Doctor Egloff's feat:

Here's to Doctor Egloff

"We are lost in admiration of Doctor Egloff, oil expert of the Universal Oil Products Co. of Chicago. In the dim, dead days of last November, he took the witness stand in a suit of his company against the Standard Oil Co. No matter what the suit is about. Doctor Egloff today (February 16) is still on the stand and still talking. The workaday world has saluted the Armistice Day colors, waxed fat on Thanksgiving turkey, dressed a Christmas tree, observed the New Year's saturnalia and paid court to its lady love on the day of St. Valentine—and Doctor Egloff is still testifying. How does he do it? Well, one day an unwary attorney asked him to define emulsion. Snapping into the subject, Doctor Egloff answered him in seven calendar days of four hours each.

"We recall Senator Morgan's mot. 'How long, Senator,' inquired the young lady, 'can you speak on any given subject?' 'It all depends, my dear,' replied the great solon gravely. 'If it is a subject I know all about, I can talk for 30 minutes at a stretch. If it is a subject on which I am completely ignorant, I can talk indefinitely.'

"Such is not the case with Doctor Egloff. He who doubts that Doctor Egloff understands the etiology, etymology, anthropology and cosmology of emulsion is automatically elected to the skeptic's society. We are confident that Doctor Egloff, far from being addicted to Morganatic bombast, is a profound scientist. We repeat that we admire him, but—remembering the seven-day reply to the emulsion question—we would never be so incautious, especially if we were in a hurry, to ask him what time it is."

ELECT KENNEDY HEAD OF ILLINOIS JOBBERS

CHICAGO, Feb. 18.—The annual meeting of the Illinois Petroleum Marketers Association was held at the Abraham Lincoln Hotel, Springfield, Ill., on February 16. The attendance was large and it was one of the best state meetings for some time.

The chief interest centered in the election of the president, for which there were two leading candidates, each strongly supported, for the position. H. E. Kennedy of the Kennedy Oil Co., of Galesburg, was successful. New members on the Board of Directors were A. I. Archambault of the Pennsylvania Oil Co., Evanston, Ill.; Bert Taggert, Sweney Oil and Gasoline Co., Peoria, and B. L. Majewski of the Shaffer Onl & Refining Co., Chicago. G. A. Primm was re-elected secretary and treasurer.

ENTERS DISTRIBUTING BUSINESS

CHICAGO, Feb. 18.—L. A. Stewart, who is engaged in the marketing of petroleum products with offices in the Pure Oil Building, has taken over a distributing business in Evanston, Ill. He will have, under the name of the Community Oil Co., a bulk plant and six service stations. The office will be at the corner of Davis and Elmwood Streets, Evanston. Mr. Stewart has had a long experience, having been for years with the old Anderson & Gustafson Co., and until recently with the Refiners Petroleum Co. He has specialized in lubricating oils.

The Austin Petroleum Co. has entered the distributing business with headquarters at 5743 West North Avenue, Chicago. Thomas and James Kanakis are the members of the concern, which will do a local distributing business in petroleum products.

BORGER PLANT RESUMES

The repair work at Borger, Tex., refinery of the Amarillo Producers & Refiners Corp. was completed during the past week and the plant resumed normal operations. New tower equipment has been installed at the plant which was damaged by a fire the latter part of January. The new towers have materially increased the yields of light end products. The plant is refining from 1,200 to 1,400 bbls. of crude oil daily.

Natural Gasoline Manufacture

OVERPRODUCTION RESPONSIBLE FOR CHANGES DURING PAST YEAR

By G. R. Hopkins*
U. S. Bureau of Mines.

The natural gasoline manufacturer, having faced overproduction and all of its effects for the past year or so, is taking the present era of surplus output of oil much more calmly than the producer and the refiner. Lacking conclusive figures for stocks, the usual barometer of overproduction, the natural gasoline manufacturer knows that his output is too high from observing the price movement or seeing the differential between the price of his product and that of refinery gasoline decline from a sizeable positive figure to a negative one.

It was formerly claimed that there was no profit in natural gasoline at 10 cents per gallon; later this was revised to 7 cents and at the present time might be reduced to 6 or even 5 cents. This should not be taken to mean that the 10 and 7-cent measurements of costs did not represent actual conditions for the part of the industry involved in the determination of those figures. It simply means that, due to an overabundance of natural gasoline in late years, the manufacturer of this product has been forced to reduce his costs or to retire from the business.

The average annual price of representative grades of natural gasoline and crude oil for the past five years and the differential between the former and an average annual price of U. S. Motor gasoline are given below to illustrate the natural gasoline price decline of 1927, following the recovery from 1923 and 1924:

	1 Average annual price per barrel of crude petroleum, Oklahoma-Kansas, gravity, 34-34.9	2 Average annual price per gallon of natural gasoline, Grade A, at Tulsa. (Cents.)	3 Average annual price per gallon U. S. Motor gasoline at Tulsa	4 Differential between 2 and 3
1923	1.56	9.4	9.9	*.5
1924	1.47	8.8	9.2	*.4
1925	1.69	12.0	10.6	1.4
1926	1.98	9.5	10.5	*1.0
1927	1.33	5.9	6.7	*.8

*Minus figure indicating higher price for U. S. Motor gasoline.

The declining margin of profit in the natural gasoline industry is illustrated by the decrease in the number of plants in the older producing districts and by the general decline in the number of operators. The following table shows the decline for the last five years in the number of natural gasoline plants in the Appalachian district, comprising New York, Pennsylvania, Ohio and West Virginia:

Year—	Plants as of Dec. 31
1923	407
1924	395
1925	354
1926	308
1927	*289

*Preliminary estimate.

The decline in the number of operators has been even more striking than the decline in the number of plants in certain areas as noted in the example above, for, taking the country as a whole, the number of new plants built to keep abreast of the discovery of new petroleum fields has nearly compensated for the number of plants abandoned. The decreased number of operators for the country as a whole is illustrated by the following table, which shows the total number of operators as of December 31 from 1923 to 1927:

Year—	Opers. as of Dec. 31
1923	455
1924	457
1925	450
1926	390
1927	*389

*Preliminary estimate.

*Published by permission of the Director, United States Bureau of Mines.

The decreased number of companies manufacturing natural gasoline in indicative of the large number of mergers and consolidations brought about by the general decreased margin of profit. This centralization of the industry reached a high point in 1926, following the material decline in prices in the late months of 1925.

Forced to Retire

The present overproduction of crude oil has driven many small producers into temporary retirement, but has left the hope, established by past experience, that consumption and the natural decline in present flush areas will gain the upper hand and much of the former general prosperity will be restored. Furthermore, it is possible in some cases for the crude oil producer to shut down his operations and in that manner aid in restoring normal conditions. On the other hand, it is usually impossible for the natural gasoline manufacturer to suspend operations. He has contracted to utilize natural gas at specified rates over a specified time and must abide by his contracts or forfeit his business. The producer sympathizes with the natural gasoline manufacturer's red figures but not to the point of voluntarily reducing his own royalty. The natural gasoline manufacturer likewise is practically obligated to keep pace with crude oil production by building plants in newly discovered fields. To do otherwise would be waste, as the production of natural gasoline is basically a conservation measure.

The output in 1927 was approximately 1,627,000,000 gallons, which represents an increase of 20 per cent over 1926. This percentage increase, although smaller than some previous annnual percentage increases, exceeded that of total motor fuel output. In other words, the percentage of natural gasoline to the total output of motor fuel is increasing. Evidence points toward another material increase in output in 1928, when the industry will have caught up with the record-breaking production of crude in 1927, and will be utilizing practically all of the available gas in these fields.

Such terms as "overproduction," "record-breaking output," and "tremendous expansion" are an old story to the natural gasoline manufacturer. What disturbs the natural gasoline industry at this time is a sizeable cloud on the marketing horizon—the noticeable slump in buying enthusiasm of the refining industry. Over 90 per cent of the total natural gasoline production is shipped to refineries, which accounts for the interest the natural gasoline manufacturer takes in the refiner.

Several years ago the refiner took the leading part in negotiating contracts for his natural gasoline requirements; today he tends to wait for the natural gasoline manufacturer to make overtures. Even then, nothing is likely to result unless the price is lower than that of the preceding contract.

The present aloofness of the refining industry is due to changes in refining practice which lessen the necessity of buying natural gasoline to bring the finished motor fuel to specifications. The majority of refiners now process their still gases, formerly allowed to escape, and obtain a substitute for natural gasoline. Cracking has been developed to a point where the refiner can control his operations and obtain directly a gasoline which will meet specifications and possess antiknock properties now so eagerly sought. A further step in this direction is seen if progress in cracking in the vaper phase continues. It is not always economically possible for the refiner to run his cracking plant as above, yet he is undoubtedly relieved of the necessity of going outside of his own organization for large quantities of a product acknowledged as none too easily handled.

Demand Heavier Fuel

Another source of concern for the natural gasoline industry is the tendency of foreign buyers to demand a heavier and less volatile motor fuel. This influence is a disquieting one despite the fact that

(Continued on Page 189)

Minor Accidents Account for Many Lost Time Injuries

Minor injuries, usually due to carelessness, are responsible for more lost time in natural gasoline plant operations than are the major accidents such as fires and explosions, according to a report of the Gas Department of the Pan-American Petroleum and Petroleum Securities Co. The February Bulletin of the gas department carries a summary of the companies' accident record for 1927.

The report states that during 1927 there were 78 accidents in the gas department, 22 of which were lost-time accidents with a total loss of 250 days. Figured at a minimum rate of $5.50 per day this lost-time represents a total loss of $1,375. Of this amount $383 was paid out in compensation. The bulletin in this connection points out "those 22 employes who sustained lost-time accidents lost $992 in salaries, while the company probably lost much more owing to interrupted work, loss of time, breaking in new men, doctor and hospital bills and the general disturbance that follows each and every accident within a plant, things that cannot be calculated in dollars and cents but must be charged to the so-called "Profit and Loss account."

No major accidents occurred during the year at the Pan-American plants. The following table summarizes the minor accidents for the year:

Cause of Accidents—	No. of Accidents
Protruding sharp point	4
Cranking concre.e mixer	1
Pinched by pliers	1
Object in eye	12
Pulling rag on pump shaft	1
Air starter on engine	1
Slipping and falling	10
Nails	6
Falling object	11
Burns—steams or steam line	5
Burns—miscellaneous	4
Slipping bar—prying	5
Carrying heavy load—strain	3
Strain—miscellaneous	3
Hit with hammer—self-inflicted	1
Gloves	1
Electric torch light	2
Splinters	2
Tool breaking or slipping	3
Unguarded sump	1
Auto accident	1
Gas line blowing out	1
Total accidents—1927	78

As to precautions to prevent these accidents the bulletin advises:

Be careful how you handle ragged wire brushes. One of our most serious injuries this month was caused by a wire brush. A wire from the brush became lodged in the hand of the injured party, and it was necessary to perform an operation to get it out. The injured party lost 12 days work as a result.

Another nail injury. Time lost 1½ days. If all protruding nails were either bent over, or, better still, entirely removed, accidents such as this would not happen. We often wonder why such small things as this are not more closely watched. A little care on the part of each of us would certainly eliminate any chance of injuries of this nature.

We have two back strain injuries this month. No time lost. That, however, does not enter into the case, as each and every injury might have been serious. Strains form a large percentage of our accidents, and every care should be taken in the lifting of heavy materials.

One man was knocked unconscious when he failed to observe the surroundings in which he was working. He was working underneath a 6-inch valve, and on assuming an upright position hit his head on the protruding valve stem. Probably the proper engineering would have located this valve where no one would be likely to be hit on the head. There is room for improvement here. Time lost, 2½ days.

Another of these injuries that are either the fault of the person or the tool. In this case the wrench slipped and the injured party sustained a severe jolt on the knee. If your wrench is faulty, do not use it. If it is in good condition, make sure that it has a good hold before applying pressure.

LONG BEACH PLANTS DAMAGED BY FIRES

LOS ANGELES, Calif., Feb. 18.—The past week was a rather disastrous one for natural gasoline operators at Long Beach, due to two separate fires which cost one life and resulted in considerable damage to plants of the Signal Gasoline Co. and the California Petroleum Corp. An explosion in the Signal Gasoline Co 's plant in the Los Cerritos section at Long Beach literally blew the roof off the plant and set fire to six derricks, four automobiles and eight small crude oil tanks. Four of the rigs were totally destroyed but the wells themselves escaped serious injury. An entire block in the old Los Cerritos, or northwest extension of the Long Beach Field was laid bare by this fire, the area being a blackened mass of twisted steel, collapsed oil tanks and ruined absorption towers.

Two days after the Signal Gasoline Co.'s fire at Los Cerritos a compressor blew out in the California Petroleum's main plant and the resulting explosion lifted a large part of the roof and carried it over 100 feet away. The east end of the sheet iron covered structure was completely blown out and while the broken and disconnected feed lines afforded fuel for the ensuing fire there was practically no damage to surrounding property.

NEW PLANT IN MAUD DISTRICT

Gillespie & Moran, Inc., are building a new natural gasoline plant in the Maud district of the Seminole area in Pottawatomie County, Oklahoma. The plant location is SW NE Section 15-7-4. The plant will have a capacity sufficient to handle 20,000,000 feet of gas daily.

ENLARGES PLANT

The Roxana Petroleum Corp. is enlarging its natural gasoline plant at Marshall in Logan County, Okla. The present output of the plant is 10,000 gallons daily and this will be increased to between 15,000 and 20,000 gallons within the next week. The exact location of the plant, which has been operating for about 90 days, is SW 19-19n-14w. The gas in that area is averaging 2½ gallons per thousand feet. The Roxana is obtaining gas from three wells.

REFINERY AND CRUDE PRICES

Quotations on Principal Refined Products and Crude Petroleum Markets in All the American Oil Fields

GASOLINE AND NAPHTHA

	Feb. 21		Feb. 14		Feb. 7	
OKLAHOMA (Group 3)—						
50-52 450 endpoint	.05½		.05⅜	.05½	.05⅜	.05½
56-58 450 endpoint	.05½		.05½		.05⅜	.05½
58-60 450 endpoint	.05⅜		.05⅝	.05¾	.05½	.05⅝
*58-60 437 endpoint (U. S. Motor)	.06211		.061042		.05¾	.06
*60-62 437 endpoint	.06413					
*60-62 400 endpoint	.06690		.065		.06⅜	.06½
*64-66 375 endpoint	.07250		.070		.06¾	.06⅞
68-70 360 endpoint	.07¼		.07⅛	.07¼	.07⅛	
64-66 437 endpoint (blend)	.06⅛	.06¼	.06		.05⅞	.06

*Weighted average prices February 20 as reported by representative refiners. Sales to jobbers only.

KANSAS—						
58-60 437 endpoint (U. S. Motor)	.06¼	.06⅜	.06⅛	.06⅜	.06⅛	.06⅜
NORTH TEXAS—						
56-58 450 endpoint	.05½		.05⅜	.05½	.05⅜	
58-60 450 endpoint	.05½		.05⅜	.05½	.05⅜	
58-60 437 endpoint (U. S. Motor)	.06	.06¼	.06		.05⅞	.06
60-62 400 endpoint	.06⅜	.06½	.06⅜	.06½	.06⅜	
64-66 390 endpoint	.06⅝		.06⅝		.06½	
64-66 375 endpoint	.06¾	.07	.06¾	.07	.06¾	.06⅞
68-70 360 endpoint	.07	.07¼	.07	.07⅛	.07	
64-66 437 endpoint (blend)	.06⅛	.06¼	.06		.05⅞	
NORTH LOUISIANA—						
58-60 437 endpoint (U. S. Motor)	.06⅜	.06½	.06¼	.06½	.06¼	
ARKANSAS—						
58-60 437 endpoint (U. S. Motor)	.06½		.06¼	.06½	.06¼	
PENNSYLVANIA—						
52-54 Naphtha	.07½	.07¾	.07½		.07½	.07¾
54-56 Naphtha	.07½	.07¾	.07½		.07½	.07¾
58-60 Gasoline	.07½	.07¾	.07½	.07¾	.07¾	.08
60 Gasoline	.08	.08¼	.08	.08¼	.08½	.08¾
62 Gasoline	.08½	.08¾	.08½	.08¾	.08¾	.09
64 Gasoline	.09	.09¼	.09	.09¼	.09	.09¼
CALIFORNIA—						
58-60 437 endpoint (U. S. Motor) domestic	.08	.08½	.07		.07	
CHICAGO DISTRICT (Based on Group 3)—						
50-52 450 endpoint (Naphtha)	.05½	.05⅝	.05½	.05⅜	.05½	.05¾
56-58 450 endpoint	.05¾	.06	.05⅝	.05¾	.05⅝	.05⅞
58-60 437 endpoint (U. S. Motor)	.06⅛	.06¼	.06	.06⅛	.05¾	.06
60-62 400 endpoint	.06½		.06½		.06½	
64-66 375 endpoint	.07		.07		.06⅞	.07
68-70 360 endpoint	.07¼		.07¼	.07⅜	.07⅛	.07¼
64-66 437 endpoint (blend)	.06⅛	.06¼	.06	.06⅛	.05¾	

NATURAL GASOLINE

	Feb. 21		Feb. 14		Feb. 7	
OKLAHOMA (Group 3)—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.05½	.05⅝	.05½	.05⅝	.05¼	.05½
Grade AA, 80-87.9, 375 e.p., rec. 90%	.05½		.05⅝		.05¼	.05⅝
Grade B, 76-83.9, 375 e p., rec. 85%	.04⅝	.04¾	.04¾		.04⅝	.04¾
Grade BB, 84-92, 375 e.p., rec. 85%	.04½	.04⅝	.04¾		.04⅝	.04¾
Grade C, 80-92, 375 e.p., rec. 78%	.04¼	.04½	.04¼		.04½	.04⅝
NORTH TEXAS—						
Grade A, 72-79.9, 375 e p., rec. 90%	.05½		.05½	.05⅝	.05¼	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.05½		.05½		.05¼	
Grade B, 76-83 9, 375 e.p., rec. 85%	.04⅝	.04¾	.04¾		.04⅝	.04¾
Grade BB, 84-92, 375 e.p , rec. 85%	.04½	.04⅝	.04¾		.04⅝	
Grade C, 80-92, 375 e.p., rec. 78%	.04¼	.04½	.04½		.04½	
NORTH LOUISIANA—						
Grade AA, 80-87, 375 e.p., rec. 90%	.05⅝	.05¾	.05½		.05½	
Grade BB, 84-92, 375 e.p., rec. 85%	.05		.05¼		.05¼	
Grade C, 80-92, 375 e.p., rec. 78%	.04⅝	.04¾	.05⅛		.05⅛	
CALIFORNIA—						
75-85, 375, 390 endpoint	.07	.07½	.07½	.08	.07½	.08
CHICAGO DISTRICT (Based on Group 3)—						
Grade A, 72-79.9, 375 e.p , rec. 90%	.05½		.05½		.05¼	.05½
Grade AA, 80-87.9, 375 e.p., rec. 90%	.05½		.05½	.05⅝	.05¼	
Grade B, 76-83.9, 375 e p., rec. 85%	.04⅝		.04¾		.04⅝	.04¾
Grade BB, 84 92, 375 e.p., rec. 85%	.04½	.04⅝	.04¾		.04⅝	
Grade C, 80-90, 375 e.p., rec. 78%	.04¼		.04¼		.04½	

Note: All natural gasoline, except California, is noncorrosive.

BURNING OIL

	Feb. 21		Feb. 14		Feb. 7	
KANSAS—						
41-43 water white Kerosene	.04⅝	.04½	.04⅝	.04½	.04⅝	.04½
OKLAHOMA (Group 3)—						
41-43 water white Kerosene	.04⅛	.04¼	.04⅛	.04¼	.04¼	
42-44 water white Kerosene	.04⅝		.04⅝	.04¾	.04⅝	.04¾
NORTH LOUISIANA—						
41-43 prime white Kerosene	.04¾	.05	.04¾	.05	.04¾	
NORTH TEXAS—						
41-43 water white Kerosene	.04¼		.04⅛	.04¼	.04¼	
40-42 water white Kerosene	.04	.04⅛	.04		.04	
ARKANSAS—						
41-43 water white Kerosene	.04¾	.05	.04¾	.05	.04¾	
PENNSYLVANIA—						
43 Kerosene prime white	.06	.06⅛	.06	.06⅛	.06	.06⅛
45 Kerosene water white	.06¼	.06⅜	.06¼	.06⅜	.06¼	.06⅜
46 Kerosene water white	.06¼	.06½	.06¼	.06½	.06¼	.06½
47 Kerosene water white	.06½	.06¾	.06½	.06⅝	.06½	.06⅝
300 Mineral Seal	.07	.07¼	.07	.07¼	.07	.07¼
CALIFORNIA—						
38-40 water white Kero. (high-burning test)	.05½	.06	.05¼		.05½	
Engine distillate, 43-45, 445 endpoint	.06½	.07	.06½	.07	.06½	.07
Engine distillate, 42-44, 480 endpoint	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
CHICAGO DISTRICT (Based on Group 3)—						
41-43 water white Kerosene	.04⅛	.04¼	.04¼	.04⅜	.04⅛	.04¼
42-44 water white Kerosene	.04⅝	.04¾	.04¾		.04¾	

FUEL OIL

	Feb. 21		Feb. 14		Feb. 7	
KANSAS—						
18-20 Fuel Oil, per bbl.	.82½	.87½	.80	.85	.80	.85
22-26 Fuel Oil, per bbl.	.87½	.90	.85	.87½	.82½	.87½
32-36 Gas Oil	.02⅝	.02¾	.02⅝		.02⅝	
38-40 Distillate	.03¼		.03¼		.03¼	.03⅜
OKLAHOMA (Group 3)—						
Below 18 Fuel Oil, per bbl.	.75	.77½	.75		.70	.75
18-22 Fuel Oil, per bbl.	.80	.82½	.77½	.82½	.75	.77½
22-26 Fuel Oil, per bbl.	.82½	.85	.80	.82½	.77½	.80
24-26 Fuel Oil, per bbl.	.85		.80	.85	.80	.85
26-30 Fuel Oil, per bbl.	.87½		.85	.87½	.85	.87½
28-30 Fuel Oil, per bbl.	.90	.95	.90	.95	.90	.95
32-36 Gas Oil (dark)	.02½		.02⅜		.02⅜	
32-36 Gas Oil (straw distillate)	.02⅝		.02½		.02½	
36-38 Distillate	.03		.03	.03⅛	.03	.03½
38-40 Straw Distillate	.03	.03⅛	.03	.03¼	.03	.03½
NORTH TEXAS—						
24-26 Fuel Oil (sellers' cars), per bbl.	.77½	.80	.75	.80	.75	.80
32-36 Gas Oil (straw)	.02⅜		.02¼	.02⅜	.02¼	.02⅜
38-40 Straw Distillate	.03		.03		.03	
NORTH LOUISIANA—						
18-20 Fuel Oil, per bbl.	.97½	1.00	.97½	1.00	.97½	1.00
32-36 Gas Oil	.03	.03¼	.03	.03¼	.03	.03¼
ARKANSAS—						
38-36 Distillate	.03½	.03¾	.03½	.03¾	.03½	.03¾
32-36 Gas Oil (straw)	.02¾		.02¾	.03	.02¾	.03
16-22 Refinery Fuel Oil, per bbl.	.97½	1.00	.97½	1.00	.97½	1.00
GULF COAST (South Texas)—						
Gas Oil	.04¼	.04½	.04¼	.04½	.04¼	.04½
Fuel Oil, per bbl.	1.25		1.25		1.25	
PENNSYLVANIA—						
30-34 Fuel Oil	.04¾	.05	.04¾	.05	.04¾	.05
36-40 Fuel Oil	.05	.05¼	.04⅞	.05	.04⅞	.05
CALIFORNIA—						
33-36 Distillate	.03½	.03¾	.03½	.03¾	.03½	.03¾
27-32 Distillate	.02½	.03	.02½	.03	.02½	.03
*15-20 Fuel Oil, Bunker (at tide water)	.85	1 00	1.00		1.00	
15-20 Fuel Oil (cargo lots), per bbl.	.75	.85	.90		.90	
27 plus Diesel, per bbl.	1.15	1.19	1.15	1.19	1.15	1.19
CHICAGO DISTRICT (Based on Group 3)—						
24-26 Fuel Oil (sellers' cars) Group 3, bbl.	.85	.90	.82½	.87½	.82½	.85
22-26 Fuel Oil (sellers' cars) Group 3, bbl.	.82½	.87½	.80	.85	.80	.82½
18-22 (Group 3), per bbl.	.82½	.85	.80	.82½	.77½	.80
16-20 Smackover, per bbl.	.95	1.00	.95	1.00	1.00	1.05
32-36 Gas Oil (zero)	.02¾	.03	.02¾	.03	.02¾	.03
32-36 Gas Oil (industrial)	.02½	.02⅝	.02½	.02⅝	.02½	.02⅝
36-38 Distillate	.03	.03¼	.03	.03⅛	.03	.03¼
38-40 Straw Distillate	.03¼	.03⅜	.03¼	.03⅜	.03¼	.03⅜

*Bunkers.

LUBRICATING OIL AND WAX

	Feb. 21		Feb. 14		Feb. 7	
OKLAHOMA (Group 3)—						
100 vis., 2 color, 20-25 cold test	.06¼	.06½	.06¼	.06½	.06¼	.06½
100 vis., 3 color, 20-25 cold test	.06	.06¼	.06	.06¼	.06	.06¼
150 vis., 3 color, 20-25 cold test	.08¼	.08½	.08¼	.08½	.08¼	.08½
150 vis., 4 color, 20-25 cold test	.08	.08¼	.08	.08¼	.08	.08¼
180 vis., 3 color, 23-28 cold test	.09⅜	.10	.09⅜	.10	.09⅜	.10
180 vis., 4 color, 23-28 cold test	.09¼	.09⅜	.09¼	.09⅜	.09¼	.09⅜
180 vis., 5 color, 23-28 cold test	.09⅛	.09½	.09⅛	.09½	.09⅛	.09½
200 vis., 3 color, 23-28 cold test	.09½	.10½	.09½	.10½	.09½	.10½
200 vis., 4 color, 23-28 cold test	.09⅜	.10¼	.09⅜	.10¼	.09⅜	.10⅜
200 vis., 5 color, 23-28 cold test	.09¼	.10	.09¼	.10	.09¼	.10
240 vis., 3 color, 25-30 cold test	.13¾	.14	.13¾	.14	.13¾	.14
240 vis., 4 color, 25-30 cold test	.13¼	.13½	.13¼	.13½	.13¼	.13½
240 vis., 5 color, 25-30 cold test	.12¼	.12½	.12¼	.12½	.12¼	.12½
280 vis., 3 color, 25-30 cold test	.15½	.16	.15½	.16	.15½	.16
280 vis., 4 color, 25-30 cold test	.15	.15½	.15	.15½	.15	.15½
280 vis., 5 color, 25-30 cold test	.14	.14½	.14	.14½	.14	.14½
Cylinder Stocks:						
600, steam refined, light green	.08	.09	.08	.09	.08	.09
600, steam refined, dark green	.06½	.07	.06½	.07	.06½	.07
190-200 vis. @ 210 Bright Stock	.30	.32	.30	.32	.30	.32
150-160 vis. @ 210 Bright Stock	.23	.25	.23	.25	.23	.25
Waxes:						
124-126 White Crude Scale Wax	.02¾	.02⅞	.02¾	.02⅞	.02¾	
PENNSYLVANIA—						
34 Neutral	.07½	.07¾	.07½	.07¾	.07½	.07¾
34 Sundebloom	.07¾	.08	.07¾	.08	.07¾	.08
36 Miners' Neutral	.06½	.06¾	.06½	.06¾	.06½	.06¾
150, 3 color	.27	.27½	.26½	.27	.26½	.27
180, 3 color	.30	.30½	.30	.30½	.30	.30½
200, 3 color	.33	.33½	.32½	.33	.32	.32½
220, 3 color	.34½	.35	.34½	.35	.34½	35
600, steam refined	.09¼	.09½	.09¼	.09½	.09	.09¼
635, steam refined	.10¼	.10½	.10¼	.10¾	.10	.10½
650, steam refined	.10¾	.11¼	.10¾	.11¼	.10½	.11
600, Pennsylvania flash	.15	.16	.15	.16	.15	.16
*550, E filtered	.15	.15½	.15	.15½	.15	.15½
*600, E filtered	.15½	.16	.15½	.16	.16	.16½
600, E filtered	.15¼	.15¾	.15	.15¼	.15	.15½
600, D filtered	.23½	.24	.23½	.24	.24½	.25
550, E filtered	.15½	.16	.15½	.16	.15½	.16
550, D filtered	.21½	.22	.21½	.22	.21½	.22•
Pennsylvania Bright Stock	.27	.27½	.27½	.28	.27½	.28
†122-124 White Crude Scale Wax	.03⅛	.03¼	.03	.03⅛	.03	.03⅛
124-126 White Crude Scale Wax	.03⅛	.03¼	.03	.03⅛	.03	.03⅛

*At Warren, Pa. †At New York.

GULF COAST (South Texas)—						
No 2 color, 100 vis., pale oil	.06½	.07½	.06½	.07½	.06½	.07½
No. 3 color, 200 vis., pale oil	.09	.09½	.09	.09½	.09	.09½
No. 3 color, 300 vis., pale oil	.10½	.11½	.10½	.11½	.10½	.11½
No. 3½ color, 500 vis., pale oil	.12	.13	.12	.13	.12	.13
No. 4 color, 750 vis., pale oil	.14	.15	.14	.15	.14	.15
No. 5 to 6 color, 200 vis., red oil	.07½	.08	.07½	.08	.07½	.08
No 5 to 6 color, 300 vis., red oil	.08½	.09	.08½	.09	.08½	.09
No. 5 to 6 color, 500 vis., red oil	.09½	.10½	.09½	.10½	.09½	.10½
No. 5 to 6 color, 750 vis., red oil	.12	.12½	.12	.12½	.12	.12½
No. 2½ color, 200 vis., pale filtered	.11½	.12	.11½	.12	.11½	.12
No. 2½ color, 300 vis., pale filtered	.13	.13½	.13	.13½	.13	.13½
No. 2½ color, 500 vis., pale filtered	.14	.15	.14	.15	.14	.15
No. 2½-3 color, 750 vis., pale filtered	.17½	.19	.17½	.19	.17½	.19

REFINERY AND CRUDE PRICES

Quotations on Principal Refined Products and Crude Petroleum Markets in All the American Oil Fields

CALIFORNIA—						
130 vis., 2½-3 color	.09	.10	.09	.10	.09	.10
200 vis., 2½-3 color	.10	.10½	.10	.10½	.10	.10½
300 vis., 3-3½ color	.10½	.11	.10½	.11	.10½	.11
350 vis., 3½-4 color	.11	.12	.11	.12	.11	.12
400 vis., 3½-4 color	.13	.14	.13	.14	.13	.14
Red Neutral:						
200 vis., 4½-5 color	.08½	.09	.08½	.09	.08½	.09
300 vis., 5-6 color	.09	.09½	.09	.09½	.09	.09½
400 vis., 5-6 color	.11	.11½	.11	.11½	.11	.11½
500 vis., 4½-5 color	.11½	.12	.11½	.12	.11½	.12
500 vis., 5-6½ color	.11	.11½	.11	.11½	.11	.11½
600 vis., 6 plus color	.12	.12½	.12	.12½	.12	.12½

Note: Bright Stocks are not manufactured commercially on the Pacific Coast.

NEW YORK (BAYONNE) REFINERY PRICES

	Feb. 21	Feb. 14	Feb. 7
Gasoline, U. S. Motor, 58-60 437	.08¼	.08¼	.08¼
Kerosene, water white, 41-43	.07½	.07½	.07½
*Fuel Oil, bunker "C," 14-16, per bbl.	1.35	1.35	1.35
*Fuel Oil, Diesel, 28-30, per bbl.	2.00	2.10	2.10
Gas Oil, 28 plus	.05¼	.05½	.05½
25 pale Paraffin Oil	.12	.12	.12
28 pale Paraffin Oil	.07	.07	.07
285 red Paraffin Oil	.11½	.11½	.11½
250 red Paraffin Oil	.10½	.10½	.10½
225 red Paraffin Oil	.09½	.09½	.09½
200 red Paraffin Oil	.09	.09	.09
Refined Wax:			
120-122 a.m.p., per lb.	.04	.04	.04
125-127 a.m.p., per lb.	.04¼	.04¼	.04¼
130-132 a.m.p., per lb.	.04¾	.04¾	.04¾
135-137 a.m.p., per lb.	.05½	.05½	.05½
Petrolatum, in bbls., carload lots, per lb:			
Dark green	.02	.02	.02
Amber	.03⅜	.03⅜	.03⅜
Extra amber	.03¾	.03¾	.03¾
Cream	.06½	.06½	.06½
Lily White	.08⅜	.08⅜	.08⅜
Snow White	.09⅜	.09⅜	.09⅜

*Lighterage, 6.5c a barrel extra.

NEW YORK (BAYONNE) EXPORT PRICES

	Feb. 21	Feb. 14	Feb. 7
Gasoline, U. S. Motor, 58-60 437, in cases	.2365	.2365	.2365
Kerosene, standard white, in cases	.1690	.1690	.1690
Kerosene, water white, in cases	.1790	.1790	.1790
600, steam refined cylinder stock, in bbls.	.17	.17	.17
635, steam refined	.19	.19	.19
650, steam refined	.20	.20	.20
600, Pennsylvania flash	.23	.23	.23
630, Pennsylvania flash	.35	.35	.35
600, Warren E	.25	.25	.25
600, Oil City E	.24	.24	.24
Light 135 Bright Stock	.40	.40	.40
Dark 135 Bright Stock	.38	.38	.38

LOS ANGELES EXPORT PRICES

	Feb. 21		Feb. 14		Feb. 7	
Kerosene, water white	.04¾	.05	.04½	.05	.04½	.05
U. S. Motor Gasoline, 53-55 437 e.p.	.06⅛	.06¼	.06	.06⅛	.06	.06⅛

CRUDE OIL PRICES

OKLAHOMA, KANSAS, NORTH AND EAST CENTRAL TEXAS

*Corsicana heavy (March 14, 1927)....$1.00
Other fields.....See gravity table

*Posted by Magnolia Petroleum Co.

TEXAS PANHANDLE

Carson and Hutchinson

Below 31 gravity	$ .60
31-31.9	.65
32-32.9	.70
33-33.9	.73
34-34.9	.76
35-35.9	.79
36-36.9	.82
37-37.9	.85
38-38.9	.88
39-39.9	.91
40-40.9	.94
41-41.9	.97
42-42.9	1.00
43-43.9	1.03
44 and over	1.06

Wheeler County

Below 29 gravity	$ .60
29-29.9	.65
30-30.9	.70
31-31.9	.75
32-32.9	.80
33-33.9	.83
34-34.9	.86
35-35.9	.89
36-36.9	.92
37-37.9	.95
38-38.9	.98
39-39.9	1.01
40-40.9	1.04
41-41.9	1.07
42-42.9	1.10
43-43.9	1.13
44 and above	1.16
Gray County	See gravity table

Humble Oil & Refining Co. Magnolia Petroleum Co. February 21.

†Iatan	Same as North Texas
Crane-Upton-Crockett	See gravity table
†Glasscock	.80
†Chalk	.80

*Includes Howard County and Westbrook Fields. Kay County Gas Co. pays $1.05 for Howard County crude, effective May 21.
†Magnolia Petroleum Co., Jan. 14, 1928.

ARKANSAS-NORTH LOUISIANA

Cotton Valley (Feb. 7, 1298)	$ .75
Bellevue (Feb. 24, 1927)	1.20
Urania (Nov. 15, 1927)	.75
East El Dorado (March 16, 1927)	1.00
Other fields	See gravity table

Note—Cotton Valley and Bellevue, Standard Oil Co. of Louisiana, Louisiana Oil Refining Co., Gulf Refining Co. and Magnolia Petroleum Co.; (Magnolia Petroleum Co. posted Cotton Valley February 8); Urania, Louisiana Oil Refining Corp.; East El Dorado, Magnolia Petroleum Co., Gulf Refining Co.

GULF COAST

(Goose Creek, Hull, Liberty, West Columbia, Orange, Boling, Sour Lake, Humble, High Island, Pierce Junction and Spindletop.)

‡Grade A (March 14)	$1.20
Grade B	See gravity table
*Jennings, La. (March 14)	$1.05
†Saratoga, Batson, Dayton (March 14, 1927)	$1.20
§Markham (March 14)	1.00

*Gulf Pipe Line Co. †Sun Pipe Line Co. ‡Humble Oil & Refining Co. and other major buyers. §The Texas Company.

SOUTH CENTRAL AND SOUTHWESTERN TEXAS

*Luling (May 5)	$1.00
†Mirando (March 14)	1.00
Rockdale-Minerva (April 15):	
Below 38 gravity	1.25
38-38.9 gravity	1.27
39-39.9 gravity	1.29
40 and above	1.31
*Thrall	
Callihan (May 15)	1.75

(Continued on Page 182)

CRUDE OIL GRAVITY TABLE

Gravity—	Okla., Kans., N. C. Tex. 1	‡ No. La. and Ark 2	Smackover, Ark. 3	Stephens, Ark. 4	Gray County (Texas Panhandle) 5	Crane, Upton, Pecos, Crockett Counties (West Texas) 6	Salt Creek, Wyo. 7	Grade B & Light (Crude (G. Coast) 8	Somerset (South Central Texas) 9
24 and above	....	....	.90	....	....	....	....	....	....
Below 24	.76	....	.75	....	....	....	....	....	....
Below 25	....	....	....	....	....	....	....	1.15	....
24 to 24.9	.76	....	....	....	....	....	....	....	....
Below 26	....	....	....	....	.60	.60	....	....	....
26 to 26.9	.86	....	....	....	.60	.60	....	1.19	....
27 to 27.9	.91	....	....	....	.65	.60	....	1.21	....
Below 28	....	.91	....	.75	....	....	....	....	....
28 to 28.9	.96	.96	....	.87	.70	.60	....	1.23	....
29 to 29.9	1.01	1.01	....	.89	.75	.60	1.01	1.25	....
30 to 30.9	1.06	1.06	....	.91	.80	.60	1.06	1.27	....
31 to 31.9	1.11	1.11	....	.93	.85	.60	1.11	1.29	....
32 to 32.9	1.16	1.16	....	.95	.90	.60	1.16	1.31	1.05
33 to 33.9	1.19	1.19	....	....	.93	.60	1.19	1.33	1.07
34 to 34.9	1.22	1.22	....	....	.96	.60	1.22	1.35	1.09
35 to 35.9	1.25	1.25	....	....	.99	.60	1.25	1.37	1.11
36 to 36.9	1.28	1.28	....	....	1.02	.60	1.28	....	1.13
37 to 37.9	1.31	1.31	....	....	1.05	....	1.31	....	1.15
38 to 38.9	1.34	1.34	....	....	1.08	....	....	....	1.17
39 to 39.9	1.37	1.37	....	....	1.11	....	....	....	....
40 to 40.9	1.40	1.40	....	....	1.14	....	....	....	....
41 to 41.9	1.43	1.43	....	....	1.17	....	....	....	....
42 to 42.9	1.46	1.46	....	....	1.20	....	....	....	....
43 to 43.9	1.49	1.49	....	....	1.23	....	....	....	....
44 to 44.9	1.52	1.52	....	....	1.26	....	....	....	....
45 to 45.9	1.55	1.55	....	....	....	....	....	....	....
46 to 46.9	1.58	1.58	....	....	....	....	....	....	....
47 to 47.9	1.61	1.61	....	....	....	....	....	....	....
48 to 48.9	1.64	1.64	....	....	....	....	....	....	....
49 to 49.9	1.67	1.67	....	....	....	....	....	....	....
50 to 50.9	1.70	1.70	....	....	....	....	....	....	....
51 to 51.9	1.73	1.73	....	....	....	....	....	....	....
52 and above	1.76	1.76	....	....	....	....	....	....	....

Column 1—Magnolia Petroleum Co. posted schedule February 21, 1928, making price below 30 gravity $.75 per barrel, 30-30.9 gravity $.90 and 31-31.9 gravity $1.05, with 3 cents increase per degree higher in gravity, taking 32-32.9 gravity at $1.16 as basis, with a top price of $1.76 for 52 and above.

Oklahoma—Prairie Oil & Gas Co., Sinclair Oil & Gas Co., Gypsy Oil Co., Carter Oil Co., The Texas Company, February 21.

North Central Texas—[Including Ranger, Mexia, Powell, Richland, Wortham, Lytton Springs (Southwest Texas), Iatan and Panola (Magnolia only. Iatan posted on flat price of $.93 by Magnolia on January 14, 1928). Currie, Nocona, Morgan and Corsicana light]; Texas, Prairie, Sinclair and Gulf; The Texas Company, Humble Oil & Refining Co., February 21.

Kansas—Prairie, Sinclair; Carter, The Texas Company, February 21.

Column 2—Arkansas and North Louisiana—[Caddo, Bull Bayou, Crichton, De Soto, Haynesville, Homer and El Dorado only]; Standard Oil Co. of Louisiana, February 21.

Column 3—February 6, Louisiana Oil Refining Co. February 7, Standard Oil Co. of Louisiana, The Texas Company, Gulf Refining Co., Magnolia Petroleum Co. February 8, and Atlantic Production Co. February 10.

Column 4—Atlantic Oil Producing Co., February 21.

Column 5—Humble Oil & Refining Co., Magnolia Petroleum Co., February 21.

Column 6—Humble Oil & Refining Co., August 22; Kay County Gas Co., Magnolia Petroleum Co., and Gulf Pipe Line Co., August 24.

Column 7—Midwest Refining Co., February 21. All crude over 37 gravity, $1.31 per barrel.

Column 8—Humble Oil & Refining Co. and other major buyers (schedule ends "35 and above"), March 14, with exception of Magnolia Petroleum Co., which stops at 31 degrees gravity. Sun Pipe Line Co. posted 2 cents differential for each degree above 35 gravity and $1.47 for 40 gravity and above.

Column 9—Grayburg Pipe Line Co. and Pioneer Oil & Refining Co., April 7.

CALIFORNIA CRUDE OIL PRICES

Standard Oil Co.-Union Oil Co. (Effective April 1, 1927)*

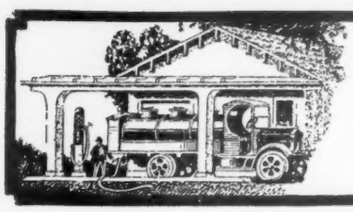
Gravity—	Fullerton Seal Beach Long Beach Huntington Beach Richfield Rosecrans-Dominguez Torrance-Inglewood 1	Whittier La Habra Montebello 2	Kern River Newhall-McKittrick Midway-Sunset Elk Hills Lost Hills Belridge Buena Vista Hills Coyote 3	4	‡ Santa Fe Springs 5	Coalinga 6	Wheeler Ridge 7	Santa Maria Ventura, Orcutt Salt Lake 8
14°	.85	.85	.75	.85	....	.75	.75	.85
15°	.85	.85	.75	.85	....	.75	.75	.85
16°	.85	.85	.75	.85	....	.75	.75	.85
17°	.85	.85	.75	.85	....	.75	.75	.85
18°	.85	.85	.75	.85	....	.75	.75	.85
19°	.85	.85	.75	.85	....	.75	.75	.85
20°	.85	.85	.77	.85	....	.76	.76	.85
21°	.86	.85	.79	.86	.85	.77	.77	.85
22°	.87	.85	.81	.87	.85	.78	.78	.85
23°	.88	.85	.83	.88	.85	.79	.79	.85
24°	.89	.85	.85	.89	.85	.80	.80	.85
25°	.90	.86	.87	.90	.86	.81	.81	.86
26°	.92	.87	.89	.91	.87	.83	.82	.87
27°	.94	.88	.91	.92	.88	.85	.83	.88
28°	.96	.89	.93	.93	.89	.87	....	.89
29°	.98	.90	.96	.94	.91	.89	....	.91
30°	.99	.91	.99	.95	.93	.91	....	.93
31°	1.00	....	1.02	....	.95	.93	....	.95
32°	1.06	....	1.05	....	.97	.95	....	.97
33°	1.09	....	1.08	....	.99	.97	....	.99
34°	1.12	....	1.11	....	1.01	.99	....	1.01
35°	1.15	....	....	....	1.03	1.01	....	1.03
36°	1.18	....	....	....	1.06	....	....	1.06
37°	1.21	....	....	....	1.09	....	....	1.09
38°	1.24	....	....	....	1.12	....	....	1.12
39°	1.27	....	....	....	1.15	....	....	1.15
40°	1.30	....	....	....	....	....	....	....
41°	1.33	....	....	....	....	....	....	....
42°	1.36	....	....	....	....	....	....	....

*Column 1—Long Beach, Seal Beach and Huntington Beach crudes, 14 to 32 degrees, inclusive; Richfield and Fullerton, 14 to 30 degrees; Torrance and Inglewood, 14 to 28 degrees; Dominguez, 24 to 42 degrees. Rosecrans crude ranges from 14 to 42 degrees, but only Union Oil Co. posts below 24 degrees.

Column 2—Whittier crude, 14 to 22 degrees; Montebello, 14 to 30 degrees.

Column 3—Kern River, Newhall and McKittrick, 14 to 19 degrees; Midway-Sunset, Buena Vista and Elk Hills, 14 to 33 degrees; Lost Hills and Belridge, 14 to 34 degrees.

Column 8—Salt Lake, 14 to 19 degrees, inclusive; Santa Maria, 14 to 30 degrees; Ventura and Orcutt, 14 to 39 degrees. Posted by Union Oil Co.



TANK WAGON MARKETS

Tank wagon quotations for gasoline and kerosene in United States as furnished by the larger marketing concerns Feb. 21.

ALL TANK WAGON AND SERVICE STATION QUOTATIONS INCLUDE TAXES

STANDARD OIL CO. (INDIANA)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
Chicago dist.	16.0	18.0	2.0	12.0
Decatur, Ill.	15.5	17.5	2.0	12.1
E. St. Louis	15.1	17.35	2.0	11.2
Joliet	16.4	18.4	2.0	12.3
Peoria	16.2	18.2	2.0	12.1
Quincy	16.2	18.2	2.0	11.9
Davenport, Ia.	15.5	17.5	3.0	12.3
Des Moines	15.9	17.9	3.0	12.3
Keokuk	17.5	19.5	3.0	12.3
Sioux City	17.1	19.1	3.0	11.9
Duluth, Minn.	15.5	17.5	2.0	12.9
Minneapolis	15.0	16.0	2.0	12.9
Mankato	14.1	16.1	2.0	12.7
La Crosse, Wis.	17.2	19.2	2.0	13.0
Milwaukee	16.1	18.1	2.0	11.9
Madison	16.3	18.3	2.0	12.1
Detroit, Mich.	15.8	17.8	3.0	13.7
Grand Rapids	17.7	19.7	3.0	13.6
Saginaw	17.9	19.9	3.0	13.8
Evansville, Ind.	17.0	19.0	3.0	13.0
Ft. Wayne	16.4	17.4	3.0	12.4
Indianapolis	15.2	16.2	3.0	12.2
South Bend	17.4	17.4	3.0	13.4
Fargo, N. D.	15.0	17.0	2.0	14.9
Huron, S. D.	19.5	21.5	4.0	13.9
Sioux Falls	14.0	18.0	4.0	13.4
*K. C., Mo.	14.9	16.9	3.0	10.6
*Springfield	16.8	18.8	3.0	11.5
*St. Louis	15.6	17.9	2.5	11.3
*St. Joseph	14.5	16.5	3.0	11.2
Wichita, Kans.	14.8	16.8	2.0	10.8
Bartlesville, Ok.	15.5	17.5	3.0	10.5

NAPHTHAS

	Tank wagon	Tank car
Oleum spirits	14.7	9.5
V. M. & P. naphtha	16.2	11.0
Cleaner's naphtha	13.0	12.0
Stanisol	19.0	12.5

Tank wagon prices f.o.b. Chicago; tank car prices f.o.b. Whiting.

STANOLIND FURNACE OIL IN CHICAGO

Less than 100 gallons	9.0
100 to 799 gallons	8.0
800 or more gallons	7.5

Note—Outside Chicago furnace oil discount of 1 cent per gallon is given on deliveries of 100 to 349 gallons and 1½ cents on deliveries of 350 gallons or more.

Tank wagon prices of gasoline subject to discount of 1 cent a gallon on dumps of 50 gallons or more throughout territory except Chicago district where discount applies only to dumps of 100 gallons. Kerosene subject to 1 cent discount on dumps of 50 gallons or more.

Outside the Chicago district, the following quantity discount schedule is in effect on monthly tank wagon deliveries of gasoline: 6,000 gallons or more, 1¼ cents; 10,000 gallons or more, 2 cents; 15,000 gallons or more, 3 cents. These discounts include the 1 cent allowed on dumps of 50 gallons or more at one delivery.

Within the Chicago district, the following quantity discount schedule is in effect on tank wagon deliveries of gasoline: 750 to 2,000 gallons, one-half cent; 2,000 to 3,000 gallons, three-fourths cent; 3,000 to 6,000 gallons, 1 cent; 6,000 to 10,000 gallons, 1¼ cents; 10,000 to 15,000 gallons, 2 cents; 15,000 gallons or more, 3 cents. These discounts are in addition to the special discount of 1 cent on dumps of 100 gallons or more at one delivery.

If the quantity bought during the year is equal to or exceeds 12 times the agreed monthly quantity, the discount is paid or credited on the entire quantity at the close of the term less the monthly payments made during the year.

*State tax 2 cents; remainder city tax.

OHIO

Standard Oil Co. (Ohio)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
All Ohio points	17.0	18.0	3.0	14.5

SOUTHWESTERN DISTRICT

Magnolia Petroleum Co.*

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
Dallas, Tex.	12.0	15.0	3.0	11.0
Fort Worth	14.0	16.0	3.0	10.0
Houston	13.0	15.0	3.0	15.0
San Antonio	13.0	15.0	3.0	10.0
El Paso	14.0	15.0	3.0	16.0
Texarkana	15.0	13.0	3.0	12.0
Muskogee, Ok.	15.0	13.0	3.0	10.0
Okla. City	13.0	14.0	3.0	10.0
Tulsa	13.0	14.0	3.0	10.0
Ft. Smith, Ark.	14.0	17.0	5.0	10.0
Little Rock	16.0	16.0	5.0	11.0

*The following is the schedule of discounts on quantity gasoline sales adopted by the Magnolia Petroleum Co. in Oklahoma: Over 750 gallons a month, one-half cent; over 2,000 gallons, three-quarters cent; over 3,000 gallons, 1 cent; over 4,500 gallons, 1¼ cents; over 6,000 gallons, 1½ cents; over 8,000 gallons, 1¾ cents; over 10,000 gallons, 2 cents. If the quantity bought during the year is 12 times the monthly agreed purchases, the discount will be paid or credited on the entire quantity for the year less any monthly purchases.

The schedule on service station deliveries is: Over 200 gallons a month, 1 cent; over 300 gallons a month, 1¼ cents; over 400 gallons, 1½ cents; over 500 gallons a month, 1¾ cents; over 600 gallons, 2 cents. The same rule applies for annual purchases in the tank wagon discounts.

CENTRAL SOUTH DISTRICT

Standard Oil Co. (Louisiana)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
*N. Orleans, La.	15.5	18.5	3.0	14.0
Baton Rouge	14.0	17.0	2.0	13.5
Alexandria	15.0	18.0	3.0	14.0
La Fayette	15.0	18.0	2.0	13.5
Lake Charles	15.5	18.5	2.0	14.0
Shreveport	15.5	18.5	2.0	13.0
Kn'xville, T'nn.	19.5	22.5	3.0	15.0
Memphis	17.0	18.5	3.0	14.0
Chattanooga	19.5	22.5	3.0	15.0
Nashville	18.0	21.0	3.0	15.0
Bristol	19.0	22.0	3.0	14.0
Lit. Rock, Ark.	16.0	16.0	5.0	11.0

*Tax of 3 cents includes city tax of 1 cent.
*Louisiana kerosene prices include 1-cent state tax and 1-cent parish tax.

SOUTHERN DISTRICT

Standard Oil Co. (Kentucky)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
Atlanta, Ga.	17.0	19.0	4.0	14.0
Augusta	19.0	22.0	4.0	16.5
Macon	16.0	19.0	4.0	13.5
Savannah	17.0	19.0	4.0	14.5
Birm'h'm, Ala.	18.0	21.0	4.0	14.5
Mobile	17.0	20.0	4.0	14.0
Montgomery	16.0	19.0	5.0	15.5
Clarks'le, Miss.	17.0	20.0	4.0	11.5
Jackson	17.0	20.0	4.0	11.5
Natchez	16.5	19.5	4.0	14.0
Gulfport	18.5	21.5	6.0	14.0
Vicksburg	16.5	19.5	4.0	14.0
Jack'ville, Fla.	18.0	21.0	5.0	11.5
Miami	20.0	23.0	5.0	14.5
Pensacola	19.0	22.0	5.0	13.0
Tampa	18.0	21.0	5.0	13.0
Lexington, Ky.	18.0	21.0	5.0	15.5
Covington	19.0	22.0	5.0	15.5
Louisville	18.0	21.0	5.0	15.0

In addition to the state tax of 4 cents on gasoline, Montgomery has city tax of 1 cent on gasoline. Kerosene prices in Georgia include 1 cent tax. In Florida, an inspection fee of 0.125 cent; in Alabama, an inspection fee of one-half cent on kerosene only. Pensacola tax includes 1 cent city levy. Gulfport tax includes privilege tax of 2 cents in addition to state tax.

PENNSYLVANIA-DELAWARE AND PART NEW ENGLAND

Atlantic Refining Co.

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
Pittsburgh, Pa.	16.0	*22.0	...	14.0
Philadelphia	15.0	*21.0	...	14.5
Scranton	16.0	*22.0	...	14.0
Allentown	16.0	*22.0	...	14.0
Altoona	16.0	*22.0	...	14.0
Erie	12.0	*18.0	...	14.0
Dover, Del.	19.0	22.0	3.0	14.0
Wilmington	19.0	22.0	3.0	14.0
Spring'd, Mass.	16.0	16.0	...	15.0
Worcester	15.0	15.0	...	15.0
Boston	15.0	15.0	...	15.0
Providence, R.I.	19.0	19.0	2.0	15.0
Hartford, Conn.	18.0	18.0	2.0	15.0
New Haven	18.0	18.0	2.0	15.0

*Includes tax of 3.0 cents. Pennsylvania tax is collected by the dealer and paid by him direct to the State.

NEW YORK AND PART OF NEW ENGLAND DISTRICT

Standard Oil Co. (New York)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
Albany, N. Y.	17.0	19.0	...	15.0
*New York	17.0	19.0	...	15.0
Buffalo	17.0	19.0	...	14.0
Rochester	13.0	16.0	...	14.0
Syracuse	17.0	19.0	...	15.0
Boston, Mass.	17.0	19.0	...	15.0
Augusta, Me.	21.0	23.0	4.0	15.0
M'nch't'r, N. H.	19.0	23.0	4.0	15.0
Burlington, Vt.	20.0	22.0	3.0	15.0

*Price in steel barrels.

NEBRASKA

Standard Oil Co. (Nebraska)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
Omaha	15.25	17.25	2.0	13.25
McCook	14.75	14.75	2.0	11.50
Norfolk	16.75	18.75	2.0	12.75
N. Platte	17.75	19.75	2.0	13.50
Scottsbluff	17.25	19.25	2.0	13.00

PACIFIC COAST DISTRICT

Standard Oil Co. (California)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
San Francisco	17.0	21.0	3.0	15.5
Pueblo	18.0	18.0	3.0	15.5
Los Angeles	16.5	20.5	3.0	15.5
Reno, Nev.	22.0	26.0	4.0	19.0
Portland, Ore.	17.5	21.5	3.0	16.5
Seattle, Wash.	16.5	20.5	2.0	16.5
Tacoma	16.5	20.5	2.0	16.5
Spokane	20.5	24.5	2.0	20.5
Phoenix, Ariz.	23.0	27.0	4.0	20.5

ATLANTIC COAST DISTRICT

Standard Oil Co. (New Jersey)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
Atlantic City	18.0	20.0	2.0	14.0
Newark, N. J.	18.0	20.0	2.0	14.0
Annapolis, Md.	20.0	23.0	4.0	12.0
Baltimore	20.0	23.0	4.0	10.0
Cumberland	20.0	23.0	4.0	14.0
Washington	18.0	21.0	2.0	12.0
Danville, Va.	20.5	....	4.5	14.0
Norfolk	20.5	23.5	4.5	12.0
Petersburg	20.5	23.5	4.5	14.0
Roanoke	20.5	23.5	4.5	14.0
Richmond	18.5	21.5	4.5	14.0
Ch'rslt'n, W.Va.	20.0	23.0	4.0	14.0
Keyser	20.0	23.0	4.0	14.0
Parkersburg	17.0	20.0	4.0	14.0
Wheeling	20.0	23.0	4.0	14.0
Charlotte, N. C.	20.0	23.0	4.0	14.0
Hickory	20.0	20.0	4.0	14.0
Mt. Airy	20.0	23.0	4.0	14.0
Salisbury	20.0	23.0	4.0	14.0
Charlst'n, S. C.	20.0	23.0	5.0	14.0
Columbia	20.0	23.0	5.0	14.0

ROCKY MOUNTAIN DISTRICT

Continental Oil Co.

	Gasoline			Kero.
	Tank wagon	Service station	Incl'd's tax	tank wagon
Denver, Colo.	16.0	18.0	3.0	12.5
Pueblo	16.0	18.0	3.0	14.5
Grand Jnctn.	20.0	22.5	3.0	18.0
Casper, Wyo.	17.0	19.0	3.0	13.0
Cheyenne	18.0	20.0	3.0	14.5
Butte, Mont.	22.5	22.5	3.0	19.0
Helena	22.5	24.5	3.0	19.0
Salt L'ke, Utah	20.0	21.0	3.5	17.0
Albu'que, N. M.	21.0	24.0	5.0	17.0
Boise, Idaho	23.5	25.5	4.0	19.0
Twin Falls	23.5	25.5	4.0	19.0

TANK WAGON CHANGES

February 12—Standard Oil Co. of Indiana advanced the gasoline tank wagon price to 16 2 cents and the station price to 18.2 cents in Peoria, Ill. They also advanced the gasoline station price to 16.0 cents in Minneapolis, Minn.

The gasoline tank wagon has been reduced to 15.5 cents and the station price to 17.5 cents at Bartlesville, Okla.

Kerosene was reduced to 10.5 cents in Bartlesville, Okla.

CRUDE PRICE CHANGES

February 16.—Magnolia Petroleum Co. reduced low gravity Mid-Continent crudes making 31-31 9 gravity oil $1.05, 30-30.9 gravity 90 cents and all oil below 30 gravity 75 cents.

February 21.—Prairie Oil & Gas Co. posted new prices on Mid-Continent crudes holding the 36 gravity oil at the same price but advancing the differential to 3 cents per degree in gravity above 36, replacing the previous 2-cent differential. The differential was increased to 3 cents on crude below 36 gravity to and including 32 gravity oil and a 5-cent differential per degree was posted on oil heavier than 32 gravity to and including 24 gravity oil. All crude below 24 gravity was posted at 76 cents. All other major companies posted like schedules.

The Humble Oil & Refining Co. posted Wheeler crude on gravity basis with all oil below 29 gravity at 60 cents. A 5-cent advance is scheduled for each degree in gravity higher than 29 to and including 32-32.9 at 80 cents. Starting with 33-33.9 gravity crude at 83 cents, a 3-cent spread is scheduled per degree in gravity up to 44 gravity and above which is $1.16. Carson and Hutchinson County crudes are posted as follows: Below 31 gravity, 60 cents; 31-31.9 gravity, 65 cents; 32-32.9, gravity 70 cents; 33-33.9, gravity, 73 cents, and a 3-cent per degree advance in gravity is posted to and including 44 gravity which is $1.06. All oil above 44 gravity takes the $1.06 price.

Magnolia Petroleum Co. posted Gray County crude below 27 gravity at 60 cents with a 5-cent spread to and including 32 to 32.9 gravity at 90 cents. Starting with 33 to 33.9 gravity oil at 93 cents, a 3-cent advance is posted for each degree to and including 44 gravity at $1.26. All crude above 44 gravity is posted at $1.26.

Wheeler County crude was also posted under a new schedule by the Magnolia as follows: Below 29 gravity, 60 cents; 29-29.9 gravity, 65 cents, with a 5-cent differential in price to and including 32-32.9 gravity oil which is posted at 80 cents. Starting with 33 gravity oil at 83 cents, a 3-cent differential is posted for each degree higher in gravity to and including 44 gravity and above at $1.16 cents.

Atlantic Producing Co. posted Stephens County crude at the following prices: Below 28 gravity, 75 cents; 28-28.9 at

(Continued on Page 189)

CRUDE OIL PRICES

(Continued from Page 181)

Lytton Springs (Lockhart) See gravity table
Somerset ..... See gravity table

*Posted by Magnolia Petroleum Co. Thrall prices same as North Central Texas less 19½ cents per cwt. freight.
†Magnolia Petroleum Co., Humble Oil & Refining Co., Crown Central Pipe Line Co.

ROCKY MOUNTAIN STATES
Ohio Oil Co.-Midwest Refining Co.
(Effective March 14)

Rock Creek, Wyo. (March 12)	$1.31
Salt Creek	See gravity table
Big Muddy (March 13)	$1.25
Mule Creek (May 1)	1.10
Grass Creek, heavy	.90
Grass Creek, light	1.25
Elk Basin (March 12)	1.33
Lance Creek (March 12)	1.33
Poison Spider	1.00
Notches	.65
Rex Lake (February 23)	1.10
Osage	1.33
Lost Soldier (contract)	.95
Greybull-Torchlight	1.33
Hamilton Dome	.85
Cat Creek (Mont.)	1.33
Sunburst (Mont.) (Jan. 25, 1928)	1.50
Artesia (March 12)	1.00
Hogback (N. Mex.) (March 14)	1.33

Note: Salt Creek, Osage, Cat Creek, Greybull and Hogback posted by Midwest Refining Co., and the remainder by the Ohio Oil Co. Both companies post Grass Creek light and Elk Basin.

EASTERN STATES
Joseph Seep Purchasing Agency
(Effective December 17)

Penna Grade Oil in New York Transit Line (New York)	$2.10
Bradford District Oil in National Transit Lines (Pennsylvania)	2.10
Penna Grade Oil in National Transit Lines (Pennsylvania)	2.05
Penna Crude Oil in Southwest Pennsylvania Lines (West Virginia)	2.05
Penna Grade Oil in Eureka Pipe Line Lines (Pennsylvania)	2.10
Penna Grade Oil in Buckeye Pipe Line lines (Ohio)	2.15
Cabell Grade Oil in Eureka Pipe Line lines (West Virginia) (February 9, 1928)	1.35
Corning 36-cent grade oil in Buckeye Pipe Line Co.'s line (December 19)	1.45
Corning 25-cent grade oil in Buckeye Pipe Line Co.'s lines (December 19)	1.45
Somerset Oil in Cumberland Pipe Line lines (Kentucky) (February 9, 1928)	1.45
Ragland Grade oil in Cumberland Pipe Line lines (Kentucky) (August 1)	.85
Kelster (Pennsylvania) (August 1)	1.10

MIDDLE WESTERN STATES
Ohio Oil Co.
(Effective March 14, 1927)

Lima (February 10)	1.55
Wooster	1.67
Illinois	1.60
Indiana (Feb. 10, 1928)	1.32
Princeton	1.60
Plymouth	1.33
Waterloo (Nov. 17, 1926)	1.35
*Western Kentucky	1.33
**Saginaw, Mich., Saginaw Sand (May 27)	2.05
**Saginaw, Mich., Berea Sand (May 27)	1.95
†Cumberland, Clay, Barren, Clinton and Monroe Counties, Kentucky (March 16)	1.50
‡Oil in lines of Stoll Oil Refining Co. in Oil City, Ky. (March 16, 1927)	1.50
§Oil Springs (Canada) (February 10, 1928)	2.03
§Petrolia (Canada) (February 10, 1928)	1.96

*Posted by Ohio Oil Co.
†Posted by Paragon Development Co.
‡Posted by Stoll Oil Refining Co.
§Posted by Imperial Oil Co., Ltd.
**Posted by Sun Oil Co.

MEXICAN CRUDE

Note—Due to the fact that the exportation of Tuxpam light crude oil has become a negligible factor, prices will no longer be published.

*Panuco heavy (f.o.b. Mex. ports)	$1.15

*$.15.

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Oil Securities Reflect Crude Advance

After a Week in Which Many New Lows Were Recorded Market on Tuesday Scored Fractional Advances

After a week of exceptional sluggishness, the oils responded on Tuesday of this week with fractional advances which were not confined to any single group, but apparent in the entire oil family. The Mid-Continent crude price increases on the better gravities of oil were responsible for the strength manifested on Tuesday.

On Monday, the Phillips Petroleum directors announced that the quarterly dividend of 75 cents had been reduced to 37½ cents for the current quarter. This occasioned little surprise, and reflected very limitedly in the action of the stock.

The fore part of the week caused several revisions in the lows of many oils for the year 1928, and in addition, the bearish tone of the general market did nothing to help the oils. Producers & Refiners was especially weak, making a low of $16, a drop of $10 per share within the past 10 days.

With the possibility of further advances in crude price schedules, a note of optimism seemed to sweep over the oils.

California Petroleum

The consolidated statement of the California Petroleum Corp. and subsidiaries as of September 30, 1927, shows total assets of $106,606,316, compared with $98,897,909 on December 31, 1926, and profit and loss surplus of $20,648,843, against $22,269,264.

The consolidated balance sheet of the California Petroleum Corp. and subsidiaries, as of September 30, 1927, compares as follows:

Assets	Sept. 30, 1927	Dec. 31, 1926
Property account*	$81,911,881	$73,724,518
Investments	4,324,306	482,475
Bond sinking fund	189,500	556,872
Cash	2,368,613	8,035,247
Accounts and notes receivable	4,264,062	3,639,802
Oil inventories	8,768,679	7,856,686
Materials and supplies	1,856,044	1,986,155
Deferred charges	2,923,231	2,616,154
Total	$106,606,316	$98,897,909
Liabilities		
Common stock†	$51,487,950	$49,498,575
Subsidiary company stock	643,330	733,919
Bonds	25,558,972	20,823,318
Employes' stock subscription	254,000	179,000
Accounts and notes payable	3,860,038	3,463,094
Preferred called for redemption	48,360	74,080
Federal tax reserve, etc.	1,281,947	1,605,045
Capital surplus	2,822,876	251,614
Unappropriated surplus	20,648,843	22,269,264
Total	$106,606,316	$98,897,909

*After reserve for depreciation and depletion. †Par value $25.

Humble Oil & Refining

W. S. Farish, president of the Humble Oil & Refining Co., stated at the annual meeting that net profit for the year ended December 31, 1927, was approximately $7,100,000 after interest, depreciation, depletion and federal taxes, comparing with $19,385,000 in 1926.

Net profit of approximately $7,100,000 for 1927 is equal to $2.42 a share (par $25) earned on 2,924,703 shares of stock, against $6.62 a share in 1926.

Regarding present conditions in the oil industry and the policy of the Humble Oil & Refining Co., W. S. Farish stated:

"We feel that there is too much crude and products in storage now; that any policy which would lead to adding to this burden would be ill advised.

"It will be the policy of our company to carry on somewhat as we did the past year, trying to handle the business without adding any oil to storage. Our stocks of crude oil at the end of 1927 were within 500,000 bbls. of being in balance with the beginning of that year."

During 1927 the Humble Oil & Refining Co. drilled 332 wells, against 540 in 1926, and received an average of $1.23 a barrel for crude, against $1.84 a barrel in 1926. The present price of crude is 92 cents a barrel. The company produced 15,494,968 bbls. of crude, against 17,092,364 bbls. in 1926.

Indiana Pipe Line

The Indiana Pipe Line Co. for the year ended December 31, 1927, shows net income of $985,468 after taxes and depreciation, equivalent to $9.85 a share (par $50) earned on 100,000 shares of stock. This compares with $817,630, or $8.17 a share in 1926.

The statement for 1927 compares as follows:

	1927	1926
Net income	$985,468	$817,630
Dividends	*2,200,000	700,000
Deficit	$1,214,532	†$117,630
Profit and loss surplus	1,044,132	2,458,664

*Includes special dividend of $15 a share. †Surplus.

Texas Pacific Coal & Oil

The preliminary report of the Texas Pacific Coal & Oil Co. and subsidiaries for the year ended December 31, 1927, shows net income of $315,190 after depreciation, depletion, interest, amortization, etc., equivalent to 37 cents a share (par $10) earned on 838,034 shares of stock. This compares with $1,578,043, or $1.86 a share on 844,804 shares in 1926.

The above earnings are exclusive of a profit and loss credit of $616,262.

The preliminary consolidated income account for 1927 compares with 1926 as follows:

	1927	1926
Operating profit	$2,446,211	$3,821,289
Other income	513,683	874,187
Gross income	$2,959,894	$4,695,476
Interest, rentals, etc.	719,631	870,185
Depreciation, etc.*	1,925,073	2,247,248
Net income	$315,190	$1,578,043
Dividends	506,882	
Deficit	$191,692	†$1,578,043

*Includes depletion, amortization, etc. †Surplus.

Lion Oil Refining

The report of the Lion Oil Refining Co. for the year ended December 31, 1927, which is shortly to be issued, is expected to show net profit after all charges of around $2.76 a share on the outstanding 200,000 shares of no par value stock. It is understood charges for depletion and depreciation were unusually high.

North American Oil

The North American Oil Consolidated reports for the year ended December 31, 1927, gross earnings of $2,686,497, comparing with $3,274,624 in 1926, and net profit after taxes, depreciation and depletion of $1,038,426, against $1,592,650. Surplus after dividends totaled $19,054 in 1927, against $567,880 in the preceding year.

Northern Pipe Line

The Northern Pipe Line Co. for the year ended December 31, 1927, shows net income of $339,140 after depreciation and taxes.

The statement for 1927 compares with 1926 as follows:

	1927	1926
Net income	$339,140	$374,806
Dividends	320,000	320,000
Surplus	$19,140	$54,806
Profit and loss surplus	203,912	234,772

The balance sheet of the Northern Pipe Line Co. as of December 31, 1927, compares as follows:

Assets	1927	1926
Plant	$3,095,382	$3,072,730
Materials and supplies	31,069	32,711
Cash, etc.	3,644,044	3,489,227
Total	$6,770,495	$6,594,668
Liabilities		
Capital stock	$4,000,000	$4,000,000
Accounts payable*	728,207	606,321
Depreciation reserve	1,838,376	1,753,364
Surplus	203,912	234,772
Total	$6,770,495	$6,594,668

*Includes taxes and fire insurance reserve.

Prairie Oil & Gas

The annual report of the Prairie Oil & Gas Co., to be issued shortly, will show net profits for 1927 of approximately $2,500,000, according to the Wall Street Journal. This is but slightly more than $1 a share on 2,400,000 shares issued.

Sinclair Crude Purchasing

The Sinclair Crude Oil Purchasing Co. reports to the New York Stock Exchange for the 11 months ended November 30, 1927, profit of $1,111,114 after expenses and depreciation, but before federal taxes. The income account for the 11 months ended November 30, 1927, follows: Crude oil sales, $54,674,399; cost and expenses, $52,361,945; operating profit, $2,312,454; miscellaneous income, $271,308; total income, $2,538,762; depreciation, $1,472,648; profit before federal taxes, $1,111,114.

Standard Oil of Nebraska

The statement of the Standard Oil Co. of Nebraska as of December 31, 1927, shows total assets of $7,132,688. The balance sheet as of December 31, 1927, compares with 1926 as follows:

Assets	1927	1926
Plant*	$3,605,043	$2,932,249
Merchandise	1,179,092	1,050,840
Cash	553,729	963,574
Accounts receivable	366,969	328,155
Investments	1,427,855	1,989,088
Total	$7,132,688	$7,263,906
Liabilities		
Capital stock	$4,601,100	$4,559,850
Accounts payable	376,105	496,911
Federal taxes, reserves, etc.	110,865	167,129
Surplus	2,044,618	2,040,016
Total	$7,132,688	$7,263,906

*After depreciation.

Standard Oil of New York

The Standard Oil Co. of New York has called for redemption May 1 its $20,000,000 12-year 6½ per cent bonds at 3 per cent premium and accrued interest. This issue will be retired by funds from new issue of $20,000,000 of 4½ per cent debentures.

Continental Oil

The Continental Oil Co. has omitted the quarterly dividend of 25 cents a share due at this time. S. H. Keoughan, president of the company, states that earnings in 1927 were materially affected by demoralized oil prices, despite a larger volume of business in all departments than in any previous year.

"While final figures have not yet been completed," he states, "it is estimated that the company earned during 1927, over all expenses, including a deduction of approximately $3,000,000 for intan-

(Continued on Page 191)

LIST OF ACTIVE PETROLEUM STOCKS

Stocks—	Par	Clos. Quot. Feb. 20	Clos. Quot. Feb. 11	1928 High	1928 Low	1927 High	1927 Low	1926 High	1926 Low
Amerada Corp.	..	27⅛	30	32⅝	27⅛	34⅞	27⅝	32⅞	24¾
Atlantic Refining, com.	100	97⅞	101	109¾	97½	131⅝	107	128⅝	97
Barnsdall "A"	25	22⅛	22⅞	26½	22¼	35½	20¾	32½	23½
California Petroleum, com.	25	24⅛	25⅛	26⅞	24	32⅞	20	38⅛	30⅞
Houston Oil	100	120⅞	123¼	156¼	120⅞	175⅜	60¼	75	50¼
Independent Oil & Gas	..	22⅝	24⅛	28¾	21⅞	32⅝	14⅝	34	20½
Louisiana Oil	10	9⅝	10½	12⅜	9⅜	18½	10½	19⅝	12
Maracaibo	..	12½	13	18⅛	12½	22⅜	12	27⅜	18⅝
Marland	..	33¼	34⅜	38⅜	33¼	58⅛	31	63⅜	41¼
Mid-Continent Petroleum	..	25¼	26½	29½	25¼	39⅜	25½	41	25⅜
National Supply	50	90½	92⅛	96½	90½	95¾	76	84⅞	55½
Oil Well Supply	25	33⅛	35	41	34½	44⅜	31¼	36	30
Pan American, B	50	38	40⅝	46¾	38	66⅜	45⅛	72⅜	56⅛
Pan American, Western B	..	18	18½	21	19⅛	37⅞	16¾	46	34
Phillips Petroleum	..	35¾	38¾	43½	37⅛	60¼	36½	54⅞	42⅛
Producers & Refiners	50	17	22	26	16	33⅞	16¾	26	11
Pure Oil, com.	..	20⅛	20⅝	27½	19	33½	25	31	25⅜
Royal Dutch, N. Y. sh.	13.40	46½	46	48⅜	44⅝	54½	44¼	57⅜	49⅜
Shell Transport	10	42⅜	42	42⅞	39⅜	49	41½	48⅞	42
Shell Union, com.	..	24¼	24½	26¾	24¼	31⅜	24⅝	30⅝	24
Simms Petroleum	10	18½	19½	24⅜	18½	23⅞	14¼	25⅝	16½
Sinclair Consolidated	..	17½	18⅝	21¼	17½	22⅜	15⅜	24⅞	16⅜
Skelly Oil	25	25⅝	26	28¼	25	37⅜	24⅛	37⅛	27
Standard of California	25	53⅝	54⅛	56⅝	53⅝	69⅜	50⅝	63½	54
Standard of New Jersey, com.	25	37⅞	38⅝	40½	37⅞	41⅜	35¼	46⅝	37½
Standard of New York	25	29	29⅜	31⅝	28½	34⅛	29¾	47¼	30⅝
Sun Oil Co.	..	35⅛	36	39⅝	31½	34⅞	30	41¼	30⅛
The Texas Company	25	50⅝	51½	55⅝	50	58	45	58	48
Texas Pacific Coal & Oil	10	12⅞	13¼	17	12⅝	18⅞	12	19½	12⅛
Tide Water Associated	..	15	15¼	17¼	15	19¼	1⅝	21	17
Transcontinental	...	7⅜	7⅝	10¼	7⅜	10⅜	3¾	5½	3
Union Oil of California	25	43¼	42⅜	45¼	43	56½	39⅝	53⅜	37¼
Un on Tank, com.	100	121⅜	121½	125	119½	126	94	120⅝	84¼
White Eagle Oil & Refining	...	20¼	21⅛	24½	20¼	27¼	21⅜	99⅜	25⅛
Standard Oils									
Anglo-American Oil	£1	*19¾	20¼	21¾	18½	21⅝	17⅜	19¾	16½
Borne Scrymser	25	*63	*52	56	50	69	49½	75	65
Buckeye Pipe Line	50	*59	*62	63	58	59	45	59½	42
Chesebrough Manufacturing Co.	25	*125	*128	149¾	120	126	76½	81¼	63
Continental	10	16¼	17⅜	23	16	22⅝	16¼	25¾	10½
Cum erland Pipe Line	100	*102	*103	105	94	§137	90	147	102
Eureka Pipe Line	100	*67	*67	70	64½	66	47	43¾	43
Galena Signal, com.	100	*4¾	5	6½	4	13½	4½	32½	9⅞
Humble Oil & Refining Co.	25	59¼	61½	68	59¼	67⅜	54	99⅝	52
Ill nois Pipe Line	100	181⅜	180	185½	176½	181¼	123¾	144	131
Imperial Oil	..	56⅞	5⅝	65¼	56⅞	64⅝	37⅝	39⅝	32½
Indiana Pipe Line	50	75	75½	78⅝	75	93	61	68	52½
International Petroleum Co.	10	35	37½	43	35	36⅜	28¼	35¼	28⅝
National Transit Co.	12.50	*22½	*22⅝	23⅞	20½	23¼	13¼	30⅜	27¼
New York Transit	100	*48	*48	48	38½	42	31¼	61½	27¼
Northern Pipe Line	100	*105	*101½	103	94	96	70	80½	64
Ohio Oil Co.	25	58½	60¼	66⅜	58½	66	52	67⅜	55⅜
Penn-Mex Fuel	25	*33	*38¼	39⅞	33	36½	12	24¼	15
Prairie Oil & Gas	25	48	48½	50¼	48	55½	45⅝	60¼	49
Prairie Pipe Line	100	207	186½	207	184	189¼	132	137½	122½
Solar Refining Co.	100	*175	*176	178	175	§201½	178	212	184½
South Penn Oil	25	*37¼	*37⅞	40½	36⅝	41½	34½	50	30
Southwest Pa. Pipe Line	100	*90	*87½	88¾	70	78	55½	56	47⅛
Southern Pipe Line	50	*23	*27	33½	21	39	18¼	27	34
Standard of Indiana	25	71⅝	76	80½	71¼	80¼	64⅝	70½	60½
Standard of Kansas	25	15⅝	15¼	17½	15	20⅞	15⅝	36½	16½
Standard of Kentucky	25	124¾	126	133	124	125½	111½	134⅝	107
Standard of Nebraska	25	41	41¼	43	41	49¼	43	51¼	42
Standard of Ohio, com.	100	73	73½	79	75	81½	72	362	192½
Swan & Finch, com.	25	16½	*17	17⅜	16½	21	14½	21	18
Vacuum Oil	25	138¼	143½	148¼	138¼	147	95¼	109⅝	94½
Miscellaneous									
Gulf Oil Corp. of a.	25	101¼	102¼	117¼	101¼	116	86¼	95	82½

*Bid, no sales. ‡Old stock. †New stock. §Ex-dividend.
Quotations furnished by W. J. Wollman & Co.

The Oil and Gas Journal's weekly average price of 20 representative petroleum stocks listed on the New York Stock Exchange and New York Curb was as follows:

Feb. 20	60.77	Jan. 16	63.87	Dec. 12	62.07
Feb. 13	61.02	Jan. 9	63.55	Dec. 5	62.06
Feb. 6	62.03	Dec. 31	62.09	Nov. 28	62.92
Jan. 30	62.75	Dec. 27	62.86	Nov. 21	63.66
Jan. 23	63.49	Dec. 19	63.24	Nov. 14	62.78

BIG DROP IN HIGH GRADE OIL PRODUCTION

(Continued from Page 31)

reduced to $1.47 on March 5 and to $1.28 on March 12, which price has prevailed with the bulk of oil buyers since that time

Oil of 36 gravity in the Mid-Continent was selling at $2.29 per barrel in the last week of October, 1926, when the production of all oils was 2,340,109 bbls. per day, or 48,000 bbls. a day below the average for the week ending February 4 of this year.

That increase in production in 15 months which amounts to an average of one-sixth of a barrel per day per well seems a small thing on which to maintain a price cut of $1 per barrel, but that is the present situation.

When the price of 36 gravity crude in the Mid-Continent was $2.29 per barrel, the production of the higher grades of oil was 1,530,020 bbls. a day as against 1,584,147 bbls. in the week ending February 4, while the heavy oils and "sour" oils registered a production then of 810,080 bbls. as against 803,962 bbls. per day in the first week of this month.

Declines in Most Fields

When the first cut in the crude price was made on November 1, 1926, the Texas Panhandle was producing 157,645 bbls. per day, the heavy oil fields of Arkansas 116,675 bbls. and the Gulf Coastal fields 177,405 bbls. Those three producing divisions have seen a very pronounced falling off in production in 15 months. The Arkansas heavy oil fields have declined 47,510 bbls. per day, Texas Panhandle fields 77,040 bbls. per day, Southwest Texas fields 16,466 bbls., Gulf Coastal fields 59,844 bbls., California 35,500 bbls. and North Louisiana 7,410 bbls. Only one division shows an increase, that being the West Texas fields, which have increased their production 237,643 bbls. per day since the last week in October, 1926.

The production of the lighter grade oil of North Louisiana, Arkansas, North Central Texas, East Central Texas, Kansas and eastern fields, was lower in the first week of February, 1928, than in the last week of October, 1926, when 36 gravity oil was selling at $1 per barrel more than at present. North Louisiana has fallen off 6,745 bbls. per day; Arkansas, 10,360 bbls.; North Central Texas, 21,978 bbls.; East Central Texas, 30,872 bbls.; Kansas, 4,130 bbls.; eastern fields, 1,350 bbls.; Rocky Mountain fields, 21,948 bbls. Only in Oklahoma and California is there more light oil production now than 15 months ago. Oklahoma shows an increase of 128,060 bbls. per day and California 20,750 bbls.

High Gravity Oil Off Market

The Magnolia Petroleum Co.'s recent reductions in crude oils below 32 gravity affect, so far as that company is concerned, only such fields as Healdton, Hewitt, Graham, Duncan, Walters and Beaver Creek in southern Oklahoma. It is estimated that from these fields the Magnolia company runs an average of about 12,500 bbls. a day of oil below 32 gravity and of this it is said that only 2,600 bbls. is purchased or so-called "free" oil. The remainder is either produced by the company or royalty oil owned by it.

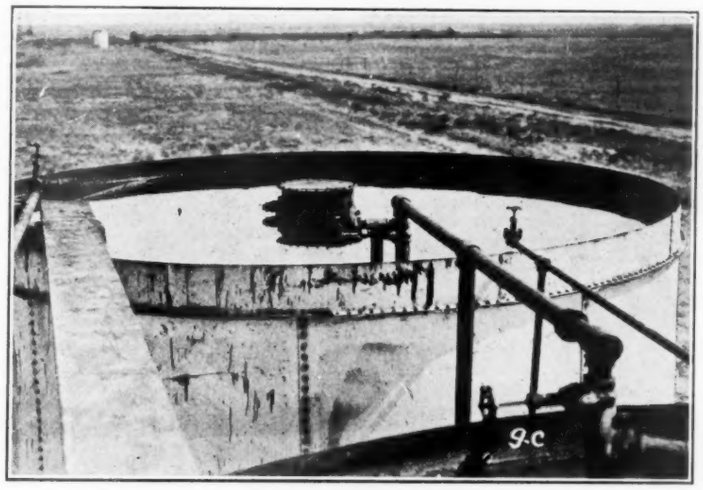
The Magnolia has been as eager to buy the higher grades of oil in the northern Oklahoma fields as any other company and it is well known that there is little high gravity oil in Kansas or Oklahoma that can be obtained by any other means than by raising the posted price or the payment of premiums. The high-grade oil market has been considered firm for some time past. The steady decline in the production of Seminole since August has been accompanied by a slow but steady decline in the production of most of the older fields of the State. The fact that light oil production in Oklahoma has fallen 209,005 bbls. in six months has brought about a condition where certain refiners find it difficult to purchase their current requirements of this grade of crude, and why certain other refiners are entering the West Texas area preparing to buy a lower-class product.

COMBATING CORROSION IN WEST TEXAS FIELDS

(Continued from Page 33)

this oxygen is necessary for the formation of this product, for instances are known where great quantities of iron sulphide scale products have been brought up from deep horizons depleted of air or oxygen, but the presence of the moisture drops on the metal accelerates rather than retards the corrosion.

In the Yates Pool during the drilling in of a well located upon a hill side it was necessary for the drillers to wear gas masks during the daylight period, but after the sun went down the atmosphere became cooler and the gas masks were no longer needed even though the well was still making the same amount of gas.



Water sealed decks, Westbrook Field, Texas.

This condition is just the reverse from a condition recited by H. C. Fowler in Serial No. 2847, "Prevention of Hydrogen Sulphide Poison in Handling and Refining High-Sulphur Petroleums" where men and animals passing through a valley in the Anglo-Persian fields of Persia at night were overcome frequently, and many were found dead. Investigation showed that hydrogen sulphide gas was being expelled from fissures in the rocks. During the daylight hours, the convection currents of that hot country caused enough air movement to prevent toxic concentrations, but at night the gas would settle in the lower parts of the valley.

The vagaries of this gas are hard to explain, another reason why local study of conditions at the wells should be made by trained observers properly equipped to carry on their work.

Iron Sulphide Scale

Prevention of the forming of iron sulphide scale is very desirable for it has been proven in laboratory experiments that this element sets up a galvanic action when brought in contact with iron or steel that causes rapid corrosion.

In a small cell prepared by Roy L. Ginter, chemist, of Tulsa, made with powdered iron sulphide scale, brine and a strip of tank steel, a current with a potential of about 100 millivolts was created and maintained with no appreciable drop for a period of about 26 days.

This was a very interesting experiment for there was evidence of a depolarizing agent present in the cell for the current maintained a constant voltage during the period of the test, and this fact being established it can be given considertion in connection with the reactions taking place within iron or steel equipment where iron sulphide is present, with any form of liquid to serve as an electrolyte.

This accelerated corrosive action due to iron sulphide scale has become very evident in the Borger area of the Panhandle District, for it is estimated that more than 50 per cent of all bolted steel tankage in use there has been corroded to failure because of it.

This condition is working a hardship in the field at this time because the wells are producing but little oil and this is selling for about 75 cents per barrel, but little over its actual cost to produce, so there is no money available for tank repairs, and consequently a number of wells have been shut down and abandoned as there was no place to put the oil.

If tanks of slightly heavier material had been used in this or any district where this condition exists the rate of penetration per year being the same the tanks would probably outlast the well.

Benefits of Heavy Tanks

The thickness of 14 gauge steel is .078125 inch and 12 gauge is .109375 inch, or 40 per cent thicker and 10 gauge steel has a thickness of .140625 inch which is 80 per cent greater than the 14 gauge metal. The costs of the tanks, however, are not proportionately higher, for as a matter of fact the heavier the metal used the lower the pound price of the tankage, and consequently the cost of corrosion is correspondingly lowered for corrosion is nothing more than the combination of iron with some other element.

Electric couples of different metals used in the construction of equipment have been found to increase the corrosion action in one metal and protect the other.

In bolted steel tanks in Panhandle area equipped with pipe steam coils in the bottom it has been found that the pipes were destroyed but the bottom of the tanks protected, except for the destruction of the nuts and bolts, used in fabrication.

This is explained by considering the iron in the pipe, bolts and nuts as forming the anodic pole of a battery and the sheet steel as the cathodic pole, the electrolyte being the heated oil, water and bottom settlings found in this part of the tank.

The steel had therefore been protected at the expense of the iron parts, and even the paint of the bottom sheets was not damaged. The paint on the sides and deck of the tank had been destroyed.

It is therefore well to bear in mind that protection to parts of equipment may be accomplished at the expense of loss of other parts and in making examination of material that has been subjected to the corrosive actions of these oils, gases and waters it is quite necessary to take into consideration all of the factors that have had bearing on the experiment.

Only in this way can the true values of protective coatings be judged, and why a material may give good results in one instance and fail utterly in another is sometimes explained by such examinations.

Even in riveted tanks care must be exercised in their erection or tension strains may be set up in the rivets and between rivets and sheets which can lead to areas of accelerated corrosion when the equipment is called upon to handle sulphur oils and hydrogen sulphide gas. Leaks around rivets in large tanks in Borger area are reported, probably due to such conditions.

In the Electrical Review, Chicago, September 19, 1908, C. F. Burgess states that mild steel bars overstrained in their middle portion were subjected to corrosion by suspension in dilute hydrochloric acid solutions, and others by making them the anode in neutral solutions of ammonium chloride and causing currents to flow under low current density. In all cases a marked difference was noted in the rate at which the strained portions corroded as compared with the unstrained. * * * The more rapid electrolytic corrosion of the strained portion appears due to the fact that the strained metal is electro-positive to the unstrained, the current finding the easier path through the surface of the electro-positive metal. That the strained metal is the more electro-positive is also shown by the liberation of hydrogen bubbles on the unstrained portion.

"Strain" Aids Corrosion

This is a condition that can be given consideration in more than one way in selecting equipment for the limestone areas, for parts that come under strains will be quickest to corrode, and this is frequently noted in pipe lines where the pipe is bent to carry the line to higher or lower levels. The smaller the radius of the bends the greater the tension strains, and it will therefore be good practice to bend all pipe on the greatest possible radius consistent with other general conditions.

This tension in steel may account for the change in the character of the material as noted in the three instances cited below, but it is thought that other elements must have entered into the combi-

Closeup view of sheet of steel storage tank showing corrosion.

nations to create the great difference noted.

The main spring of a clock-works used in a gas meter handling hydrogen sulphide gas in Ontario, Canada, failed quickly and when examined was found to have so changed in character as to be soft and readily broken between the fingers, something quite unusual for spring steel of this character.

For the purpose of analysis the spring was shipped to Pittsburgh, and later it was learned that when it was received there it had every appearance of good spring steel and therefore no analysis was made.

A second occurrence of this kind was experienced in handling steel sleeves used to join two cast iron liners for pump working barrel. This barrel had been out of the well for some weeks when examined, and tapping the steel sleeve with a hammer dented the steel very easily and it also showed deep marks at the edges.

These sleeves were shipped to factory for hardness test and they were found to have a sclerscope rating between 20 and 25. Kent's handbook states that similar rating for mild steel with 0.5 carbon is from 26 to 30 so this metal had apparently returned to its original hardness, or very nearly so.

Wire lines in West Texas wells "wicker" badly when used while drilling in, and where the line has been run in the well with tools to retard flow of oil and gas it has been found destroyed when fished out and has apparently changed in its characteristics.

When shipped to Houston for examination it was found that the wires making up the cable had the appearance of normal steel wire, having changed back from their condition at the well. Later tests at a Pittsburgh laboratory showed the wires had been greatly weakened in their resistance to flexing.

The sleeves described above could be considered as having been in tension for they had a tight fit over the end of the cast iron liners they were used with.

Removed from the liners the tension was relieved and this is the only change noted for the working barrel had been exposed to the atmosphere for some weeks so that condition alone could not account for the hardening of the metal.

In the other two instances cited tension changes took place between the time of first examination and second inspection, but the metal was also removed from the atmosphere of hydrogen sulphide gas to normal air.

This phenomenon may suggest a number of things, but it is being evidenced frequently in the limestone oil areas and seems worthy of investigation, at the well or in the tank, or wherever it occurs, and perhaps careful sampling, packing and shipment to Eastern metallurgical laboratories for further work.

Getting Rid of Gas

H. C. Fowler, petroleum engineer, Bureau of Mines, in a recent report of investigation covering the hydrogen sulphide problem states:

"That oils will lose much of their free H_2S if allowed to stand exposed to the air, and in a system that is not vapor tight, there will be an appreciable decrease in the amount of dissolved H_2S from the time the oil leaves the well until it reaches the refinery. But open storage and mechanical aeration causes evaporation losses of valuable light hydrocarbons. Therefore, this procedure does not suggest an economical way of ridding the oil of its hydrogen sulphide."

In several of the West Texas fields this gas has been carried to the atmosphere above the tanks through 20-inch diameter stacks because it has been found to be very toxic, carrying 6.00 per cent in McCamey Field, 8 to 12 per cent in Upton-Crane area, and 10 per cent in Big Lake of hydrogen sulphide in the gas, by volume, so it has been deemed expedient to dissipate this gas as quickly as possible.

There seems to be two schools of thought on this matter of stacks, one depending upon high velocity to draw the gas away from the thief holes and through the stack, and the second working on the principle of normal velocities in the stack but using gauging wells to protect the gaugers from gas.

The first type of stack is 20-inch diameter and about 8 feet high and mounted upon legs that raise it about 9 inches above the top of the manhole dome cover. This cover is perforated with an 8-inch hole in the center and over this opening there is a pipe about 4 feet 0 inches high extending up into the inside of the 20-inch stack.

A draft is created around the outside of the 8-inch short stack and inside the 20-inch stack which is strong enough to draw oil out of a flow tank where it is broken up into a mist, and this draft pulls air in at the thief hole openings keeping them free of gas so that the tanks can be gauged and thiefed without danger to the men.

The second type consists of a 20-inch diameter stack mounted directly on the open manhole dome and carries the gas to a height of about 8 feet above the tank, well above the operative's head. This flow of gas is not forced by a draft of any kind, so it would come out of the thief hole freely if it were opened.

To prevent this a tight pipe about 8 inches in diameter and 14 feet 8 inches long for high tanks, is inserted through the thief hole opening, and as soon as the oil covers the lower end of this gauging well gas cannot pass through it and the gauger can operate thief or gauging pole without danger.

The gauging well can be lifted up through the thief hole opening to permit the oil to be thoroughly mixed in the tank and it is then lowered again before gauging or thiefing is done.

Loss of Light Fractions

Either method has its advantages, but they both tend to lower the gravity of the oil, and analysis have shown that oils from the West Texas areas produce gasolines with from 72 to 80 degrees A. P .I. gravity for the first portion over, and from this it is judged that the lighter fractionations have been dissipated to the atmosphere.

From similar tests in the Mid-Continent fields it is known that oils from gas tight tanks will contain fractions higher than 85 degrees A. P. I. gravity so it seems safe to assume that this method of passing the gas to the atmosphere has weathered away from 10 to 15 degrees of gravity from the gasoline fractionations, but what percentage of the total gasoline contents of the original crude this loss will amount to is not known.

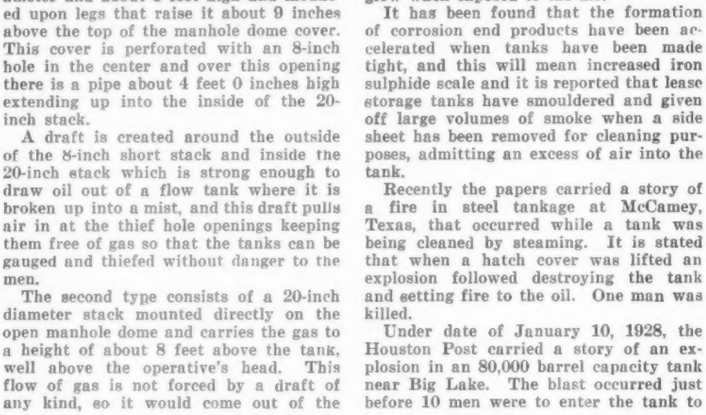
Investigations are now under way to determine the total contents of these West Texas crudes as they are delivered from the wells and this will be considered at 100 per cent and losses through the various methods of handling checked against it, and it is thought that gas tight tanks will show a saving sufficient to justify their adaption.

There are some phases of this problem that must be considered when tanks are made gas tight, and one is the formation of iron sulphide scale and its tendency to glow when exposed to the air.

It has been found that the formation of corrosion end products have been accelerated when tanks have been made tight, and this will mean increased iron sulphide scale and it is reported that lease storage tanks have smouldered and given off large volumes of smoke when a side sheet has been removed for cleaning purposes, admitting an excess of air into the tank.

Recently the papers carried a story of a fire in steel tankage at McCamey, Texas, that occurred while a tank was being cleaned by steaming. It is stated that when a hatch cover was lifted an explosion followed destroying the tank and setting fire to the oil. One man was killed.

Under date of January 10, 1928, the Houston Post carried a story of an explosion in an 80,000 barrel capacity tank near Big Lake. The blast occurred just before 10 men were to enter the tank to clean it. No attempt was made to extinguish the blaze as there was only four inches of oil in the tank and the wind was favorable to surrounding property.



Experimental cell of iron sulphide brine and steel with galvanometer.

Last fall there was an explosion in a tank that was being cleaned near Hearne, Texas, and five men were killed. No satisfactory explanation has ever been given as to the cause of this explosion. However, the tank had contained West Texas crude and was being cleaned preparatory to repairing it.

Cause of Accidents

Knowing that iron sulphide scale will glow and smoulder when exposed to air, and this reaction is accompanied by the formation of considerable heat it seems reasonable to assume that the three accidents reported above were caused by this reaction.

One well known chemist who has been studying this and allied problems for the past 10 years stated that of the two evils, destruction of the tank by iron sulphide corrision and explosions following rapid combination of oxygen and this scale in cleaning, he considered the latter one the most serious.

The character of the protective coating to be applied will vary to suit different conditions, but there are a number of very reliable paint manufacturers now offering material that has been subjected to tests for considerable periods of time in the fields and it is felt that their recommendations can be safely followed.

WEST TEXAS FIELDS

(Continued from Page 40)

quart shot at 1,859-74 feet the well swabbed 50 bbls. per day. F.H.E. Oil Co.'s No. 1-D Dora Roberts, Section 136, Block 29, was drilled to a total depth of 2,531 feet topping the pay at 2,515 feet and had an initial production of 174 bbls. of 29.9 gravity oil on the pump.

Jones County

Phillips Petroleum Co.'s No. 1 O. H. Pomroy, SE cor. SW, Section 16, Block 18, was drilled to a total depth of 2,493 feet. The well was plugged back to 2,471 feet where the pay was found at 2,463-71 feet, steel line measurement, and made 110 bbls. on pump. W. G. Stough and others' No. 1 W. C. Bennett, Section 42, Orphan Asylum Survey, was junked at 800 feet.

Pecos County

McMan Oil Co.'s No. 2 J. H. Tippett, topped the pay at 1,280 feet and was drilled to a total depth of 1,395 feet with an initial production of 20 bbls. per hour through one 4-inch line. Mid-Kansas Oil Co. and Transcontinental Oil Co.'s No. 8 Smith-Taylor, Section 33, Block 194, found the pay at 1,240-1,386 feet with an initial production of 2,297 bbls. in 16 hours through one 4-inch line. Mid-Kansas Oil Co. and Transcontinental Oil Co.'s No. 20 I. G. Yates-B, Section 61, Block 1, had an initial production of 300 bbls. per hour from pay topped at 1,155 feet and bottomed at 1,308 feet. Pandem Oil Co. and Gibson Oil Co.'s No. 10 River Bed, drilled to a total depth of 1,060 feet with an initial production of 75 bbls. per hour through one 4-inch line.

California Oil Co.'s No. 9 M. A. Smith, Lease 3, found the pay at 1,258-1,470 feet with an initial production of 108 bbls. per hour. Same company's No. 10 M. A. Smith, Lease 3, topped the pay at 1,496 feet and bottomed at 1,572 feet, and made 194 bbls. per hour through one 6-inch line. On its I. G. Yates, Lease 1, Section 34, Block 194, the California company completed during the past week wells Nos. 9, 11, and 12. No. 9 topped the pay at 1,235 feet and bottomed at 1,330 feet with an initial production of 1,500 bbls. No. 11 made 225 bbls. per hour through one 6-inch line from pay topped at 1,258-1,426 feet. No. 12 found the pay at 1,200-90 feet and had an initial production of 1,330 bbls. through one 6-inch line.

Upton County

Southern Crude Oil Purchasing Co.'s No. 1 C. W. Hobbs had a hole full of sulphur water at 3,249 feet and has been ordered shut down and plugged.

Winkler County

Turman & Maxwell's No. 7 Ida Hendricks, Section 29, Block B-5, topped the pay at 2,720 feet and oil was increased at 2,790 feet. The well was drilled to a total depth of 2,860 feet and estimated as a 2,000-bbl. producer. Nos. 1, 2 and 7 are all flowing together.

Atlantic Oil Producing Co.'s No. 1 Ida Hendricks-B, SE cor. W half NE, Section 44, Block 26, found the top of the salt at 1,910 feet, top of lime at 2,732 feet, top of pay at 2,830 feet and was drilled to a total depth of 2,936 feet with an initial production of 431 bbls. daily. Cranfill Brothers and California Oil Co.'s No. 1 M. J. Bashara, at the common corner of Sections 11, 10, 23 and 22, Block 77, topped the sand at 1,100 feet, and was drilled to a total depth of 3,503 feet. The well was dry and has been abandoned. Humble Oil & Refining Co.'s No. 1 Hendricks, Section 34, Block B-5, found the top of the salt at 1,480 feet, top of lime at 2,320 feet, top of pay at 2,927 feet and was drilled to a total depth of 2,927 feet with an initial production of 3,279 bbls. The well now shows 20 per cent b.s. Humble Oil & Refining Co.'s No. 5 Hendricks-A, Section 34, Block B-5, found the top of the salt at 1,350 feet, top of lime at 2,388 feet, top of the pay at 2,968 feet and was drilled to a total depth of 2,979 feet with an initial production of 175 bbls. per hour. Humble Oil & Refining Co.'s No. 2 Hendricks-B, Section 29, Block B-5, topped the salt at 1,353 feet, the lime at 2,594 feet and was drilled to a total depth of 3,010 feet. Pay was topped at 2,985 feet and the well had an initial production of 1,007 bbls. in 16 hours.

Independent Oil & Gas Co.'s No. 6 Hendricks-A, Section 34, Block B-5, found the top of the salt at 1,450 feet, top of lime at 2,600 feet, top of pay at

2,902 feet and made 1,200 bbls. initially at the total depth of 2,927 feet. Landreth and Roxana Petroleum Corp.'s No. 3 Hendricks-A, Section 29, Block B-5, topped the salt at 1,470 feet, lime at 2,625 feet, top of pay at 2,942 feet and was drilled to a total depth of 2,955 feet with an initial production of 3,124 bbls. Magnolia Petroleum Co.'s No. 4 Hendricks, Section 29, Block B-5, topped the salt at 1,200 feet, the lime at 2,482 feet, the pay at 2,885 feet and was drilled to a total depth of 2,908 feet with an initial production of 1,060 bbls. the first five hours. The well is now flowing 2,500 bbls. of fluid, 99 per cent b.s.

Roxana Petroleum Corp.'s No. 2 Hendricks-B, Section 29, Block B-5, topped the lime at 2,630 feet, pay at 2,995 feet and was drilled to a total depth of 3,055 feet. The well had an initial production of 1,270 bbls. daily by heads. Roxana Petroleum Corp.'s No. 4 Grisham-Hunter-C, Section 29, Block B-5, topped the salt at 1,420 feet, the lime at 2,560 feet, the pay at 2,952 feet and was drilled to a total depth of 2,970 feet. The well had an initial production of 780 bbls. per hour and is now making 2,437 bbls. through a half-inch choke.

Southern Crude Oil Purchasing Co.'s No. 2 Hendricks T-88-C, Section 28, Block B-5, found the top of the salt at 1,245 feet, top of lime at 2,434 feet, top of pay at 2,980 feet and was drilled to a total depth of 3,030 feet with an initial production of 1,360 bbls. per day. Same company's No. 6 Hendricks T-88-C, Section 28, Block B-5, topped the salt at 2,170 feet, lime at 2,528 feet, pay at 2,991 feet and was drilled to a total depth of 3,050 feet. After a shot of 280 quarts at 2,900-3,040 feet the well made 1,200 bbls. initially.

ESTIMATED DAILY AVERAGE PRODUCTION WEST TEXAS
Week Ending February 18, 1928

Big Lake	21,139
Crane County	84,522
Crockett County	3,107
Ector County	12
Fisher County	252
Glasscock County	S.D.
Howard County	4,148
Jones County	1,267
Loving County	135
Mitchell County	3,354
Pecos County	47,917
Runnels County	71
Scurry County	45
Upton County	15,515
Winkler County	117,786
Total this week	299,250
Total last week	288,451
Increase	10,799

WEST TEXAS
Daily Average Production by Leases, Week Ending February 18, 1928

Company, lease—	Wells	Bbls.
Crane County		
Church et al:		
University	1	102
Church & Weekly:		
University	3	1,244
Church & Fields:		
Duoll-University	1	135
Eastland Oil & Collett:		
University	8	4,459
Gulf Prod. Co.:		
All Leases	65	19,106
Humble O. & R. Co.:		
University	13	5,028
Independent O. & G. Co.:		
University-A	5	1,126
University-B	2	1,055
Landreth Prod. Corp.:		
Cowden-Anderson	16	9,072
Magnolia Pet. Co.:		
University-Hardwicke	14	3,054
University-O'Keefe	12	792
State-Lasseter	3	140
Magnolia et al:		
University	4	51
Pecos Oil Co.:		
University	15	4,060
Prairie O. & G. Co.:		
University	5	*323
State-Lasseter	6	*11,556
Simms & Atlantic:		
University-A	9	3,262
University-B	1	54
University-C	8	*6,141
University-D	12	*4,867
University-E	1	199
Stidham & Thrasher:		
University	1	12
The Texas Company:		
University	1	210
University-Beasley	1	20
Tidal Oil Co. et al:		
University-B	2	47
University-C	1	21
University-E	1	65
University-F	7	*2,568
University-G	3	*465
University-H	2	24
University-I	8	*4,412
Totals Church & Fields-McElroy Pools	231	83,670
Miscellaneous Crane County		
Gulf Prod. Co.:		
Waddell	1	24
Independent O. & G. Co.:		
Hughes	1	8
McMan O. & G. Co.:		
Hughes	2	69
Marland Oil Co.:		
All Leases	15	531
The Texas Company:		
King	9	220
Union Land-F	1	6
Miscellaneous total	29	852
Grand total Crane County	260	84,522
Pecos County		
Pandem Oil Co. et al:		
Pecos River Bed	4	287
California Co.:		
Yates, Lease-1	11	4,212
Smith, Lease-1	1	82
Smith, Lease-3	10	3,863
Gulf Prod. Co.:		
All Leases	10	6,148
Humble O. & R. Co.:		
M. A. Smith	6	2,502
M. A. Smith-B	4	784
Kirby Pet. Co. & Edson:		
J. H. Tippeit	1	270
Marland Oil Co.:		
Yates-A	10	976
Mazda & Savoy Oil Co.:		
M. A. Smith	1	240
McMan & Marland:		
Yates	15	3,252
Mid-Kansas & Transcontinental:		
Yates-A	13	3,539
Yates-B	19	5,521
Yates-C	9	2,556
Yates-D	2	182
Yates-E	1	125
Smith	2	72
Smith-Tayl r	8	5,713
Red Bank Oil Co.:		
Smith	2	480
Roxana Pet. Corp.:		
Tippett	7	3,238
Smith	5	902
Simms Oil:		
Smith	6	2,963
Texon O. & L. Co.:		
Yates	2	0
Total Yates Field	148	47,917
Winkler County		
Atlantic O. P. Co.:		
Grisham-Hunter	1	3,202
Grisham-Hunter-E	1	10,544
Ida Hendrick	1	297
Ida Hendrick-D	2	*2,164
Cranfill & Reynolds:		
Ida Hendrick	2	5,578
Grisham-Hunter-B	1	220
Gulf Prod. Co.:		
T. G. Hendrick	7	11,631
Humble O. & R. Co.:		
Grisham-Hunter-4	3	*10,650
Ida Hendrick-B	3	5,583
Independent O. & G. Co.:		
Grisham-Hunter	4	*6,089
Howe-B	1	2,744
Hendrick	1	35
Vardeman-B	1	362
Landreth Prod. Corp. & Roxana:		
Grisham-Hunter	2	5,636
Ida Hendrick-A	2	2,740
Magnolia Pet. Co.:		
Ida Hendrick	5	3,789
Murchison & Cranfill Bros.:		
Grisham-Hunter	2	210
Grisham-Hunter-G	1	110
Grisham-Hunter-B	1	1,060
Republic Prod. Co.:		
Grisham-Hunter-A	1	9,606
Roxana Pet. Corp.:		
Scarborough	1	20
Roxana Pet. Corp. et al:		
Grisham-Hunter-A	1	1,076
Grisham-Hunter-D	1	3,036
Ida Hendrick-C	5	6,604
Ida Hendrick-B	1	2,122
Southern Crude Co.:		
T-67 Hendrick-A	1	202
T-67 Hendrick-C	4	1,488
T-67 Hendrick-B	1	629
T-67 Hendrick-F	1	1,683
T-68 Hendrick-A	1	0
T-88 Hendrick-A	1	145
T-88 Hendrick-B	5	5,010
T-88 Hendrick-C	5	2,803
T-88 Hendrick-I	1	104
T-89 Hendrick-A	1	0
Texon O. & L. Co.:		
Grisham-Hunter-A	1	2,410
Grisham-Hunter-B	1	1,266
Pure Oil Co.:		
Grisham-Hunter	3	2,087
Turman et al:		
Ida Hendrick	4	4,851
Total Winkler County	72	117,786

*Production pinched in.

J. G. LYONS PRESIDENT OKMULGEE ASSOCIATION

At the annual meeting of the Okmulgee District Oil & Gas Association held Saturday, February 18, James G. Lyons was elected president, succeeding E. P. Jones, who was made chairman of the finance committee, after thre years as head of the organization.

The other officials elected are W. E. Wood and C. W. Wangerien vice presidents, and Charles I. O'Neill, secretary. Mr. O' Neill has been secretary of the association since its formation in 1922. At the meeting, it was reported that the association had enjoyed an unusually active year owing to the expansion of the fields within the boundary of the territory which it embraces. The association has been exceptionally active in combating legislation which might be construed as unfavorable to the petroleum industry.

Mr. Lyons, the new president, is very well known in Mid-Continent circles. He is a graduate engineer, and was born in New York City. Very soon after his education was completed, he chose the West, and came to Oklahoma in 1910 locating at Muskogee.

SECOND WELL THREATENS TO CRATER IN RICHLAND PARISH GAS FIELD

SHREVEPORT, La., Feb. 21.—The critical situation existing in the Richland Parish gas field as the result of Natural Gas & Fuel Corp.'s No. 1-A Thompson in Section 21-16-6 cratering two weeks ago was intensified when No. 3-A Thompson, 523 feet south of the crater, being drilled as one of two relief wells, also broke loose with a heavy flow of gas, fresh water and mud and is threatening to also develop a crater. This additional menace to the field came when, after setting 20-inch surface casing at 150 feet, the bit went into a fresh water sand at around 200 feet. Gas from the crater of No. 1-A Thompson has found its way into this sand, and when the strata was punctured at once sought the outlet, there being sufficient pressure behind it to send mud and water half way up the derrick. Conservation department officials were of the opinion it will not crater, but Natural Gas & Fuel Corp. is trying to move the rig off or skid the derrick to start a new hole without attempting to kill the flow and go deeper, as the well as it is will be some sort of safety valve on the existing crater.

Palmer Corp.'s No. 1 Roberson, in Section 26-23-12, Carterville district of Bossier Parish, is staging an "off again, on again" performance since showing for 2,000 bbls. of oil per day Friday. It bridged 1,000 feet from the surface and when bailed Saturday made a few heads behind the bailer and stopped. Bailed again, it repeated and then went over the crown block with an estimated 7,000 to 8,000 bbls. of fluid, throwing out a load of rocks and sand along with it. After flowing at this rate for 20 minutes, it went dead again and when brought back and pinching the gate valve started flowing at the rate of 2,000 bbls. of clean oil, maintaining this flow until 10 o'clock in the morning, when it went dead once more. Results of the bailing had not been heard from Monday afternoon. Meanwhile, The Texas Company completed No. 1 Peyton, Section 30-23-11, Carterville, as an estimated 40,000,000-foot gasser in 2 feet of sand, total depth 3,076 feet; and Bahan & Davis' No. 1 Holmes, Section 36-23-12, was completed in 4 feet of sand, total depth 3,078 feet, with the same amount of gas. The two wells offset each other in the southeast corner of the Carterville proven area. About 1½ miles south of the Palmer Corp.'s well, a showing of gas at around 2,075 feet in Natural Gas & Fuel Corp.'s No. 1 Waldrop, Section 7-21-3e, Union Parish, has attracted a number of scouts and others to watch the test of this wildcat, 7 miles northwest of production in the Monroe gas area.

—Courtesy Griffin Studios, Monroe, La.

Natural Gas & Fuel Corp.'s No. 1-A Thompson, Section 21-16-6, Richland Parish, Louisiana, burning 65,380,000 feet of gas and blowing mud, water and steam from the 200-foot crater that formed a few days after gas began leaking around the casing when the well was closed in. A day or two after the picture was made the well heaved a mass of mud into the air which snuffed out the fire when it fell back into the crater and the geyser of flame is now a geyser of mud. The well was completed January 39 at 2,477 feet, rock pressure approximately 1,200 pounds. The derrick is that for No. 2-A Thompson, about 500 feet north of the crater, being drilled as one of two relief wells. No. 3-A Thompson, now threatening to crater, is the same distance south of the wild well. The crater extends the full width of the picture.

DEATH OF JAY F. DAWSON

Jay F. Dawson, aged 67, of Tulsa, died at Fort Smith, Ark., while visiting relatives in that city. Mr. Dawson had been a Tulsa resident for 18 years, coming here from Wisconsin. He was a contractor and builder, and retired from active business two years ago owing to impaired health.

He is survived by his widow, two daughters, Mrs. W. W. Syfert of Tulsa, and Mrs. Arthur Genge, of Denver, Colo., and two sons, Rev. D. A. Dawson of Fort Smith, Ark., and Rex L. Dawson, assistant chief scout of the Carter Oil Co., Tulsa. Funeral services were held at Tulsa on Tuesday, February 21.

FACTORS INFLUENCING PRODUCTION BY FLOODING IN BRADFORD AREA

By Paul D. Torrey*
Bradford, Pa.

It is common practice to shoot the sand in wells that are designed for water intakes in much the same manner as in oil wells. The amount of water that will go into a sand of uniform texture is directly related to the exposed area of sand face. In a hard sand, such as the Bradford, it is probable that fractures are formed by shooting which extend into the sand, away from the drill hole, for a considerably greater distance than would be the case in a softer sand. The relatively large area that may be influenced by a shot is shown in the effect upon the production of adjacent pumping wells, when a new well, along a closely spaced flood line, is shot. If a well is pumping while an adjoining well is shot, the oil will foam with effervescing gas, and the volume of oil pumped will frequently be materially increased. There is good evidence that shooting is necessary because wells in which the sand has not been shot will not take sufficient water for effective flooding. Several operators have discovered this fact after failing to develop a flood around intakes that were not shot.

It is very important that a shot be placed so as to protect exceptionally porous parts of the sand. If these are further opened by heavy shooting, they pressure tends to push more rapidly into the hole the oil still held in the sand near the well. Production of oil may be continued by a movement of by-passed oil which has been left by the original flood movement.

Table 1—Record of Wells Shown in Fig. 1

Well No.	Date Completed	Date Pumping Ceased	Date Abandoned	Total Oil Production in Barrels
6		February, 1923	February, 1923	589
7		June, 1922	Jan. 5, 1923	3213
8			September, 1919	
9			September, 1919	
10	Sept. 23, 1919	May 6, 1924	Feb. 18, 1926	3526
11	Nov. 1, 1919	Oct. 7, 1920	Oct. 8, 1920	1238
12	Feb. 18, 1920	February, 1923	Feb. 6, 1923	2450
13	April 10, 1920	June, 1922	April 29, 1924	1989
14	May 14, 1920			
15	June 18, 1920	August, 1924	Aug. 11, 1924	3510
16	July 28, 1920	October, 1924	Nov. 9, 1924	3666

may be made so permeable as to take practically all of the water available, leaving none to work on the rest of the sand. In areas where an exhausted gas pay overlies the oil pay, the upper part of the sand is not shot and it is commonly packed off at the top of the oil pay, to further prevent the water from moving through the upper part.

Effect of Selective Abandonment

As pumping wells along a flood line reach the economic limit of production, they are abandoned as water-intake wells. The abandonment of these wells which are nearly watered out may be materially postponed in an endeavor to maintain a straight flood front, or it may be hastened in order to allow the flood to act more effectively on a new line of producing wells. Where there is no special need for additional water intakes, a well that is producing 20 times as much water as oil may be profitably pumped if there is no large maintenance cost.

It is obvious that the poorest wells will be abandoned first, and this may result in materially prolonging the life of the adjacent producing wells. Fig. 1 shows the wells along a flood line; Table 1 gives the record of these wells; and Fig. 2 shows the average daily oil production of some of the same group of wells. It will be noted that the date pumping ceased and the date of abandonment corresponds, in a general way, to increases in oil production at near-by wells. As the sand becomes more nearly watered out, larger quantities of water will be circulating through it, as has been previously explained. Some of this water may not be removed by pumping, and therefore it moves on to affect the wells beyond. As a flood advances, the sand becomes more nearly saturated with water, and if additional pressure is added through a new water well, it is transmitted with much greater facility toward those wells on the same row which are still being pumped. The effect on their oil production is generally noted within a few months, because the increased

*Before A.I.M.E. New York meeting. Copyright, 1927, by the American Institute of Mining and Metallurgical Engineers, Inc.

removed from the sand, it will be much easier for water to take its place in the pore spaces. A fairly fixed amount of water is available until more producing wells are abandoned, and, as a certain amount of water will tend to move toward the new wells, there will be a dim-

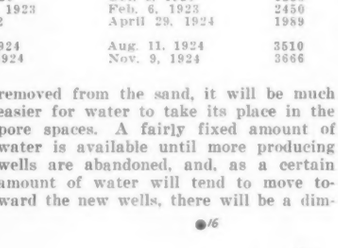


Figure 1.
Map showing locations of wells described in Table 2.

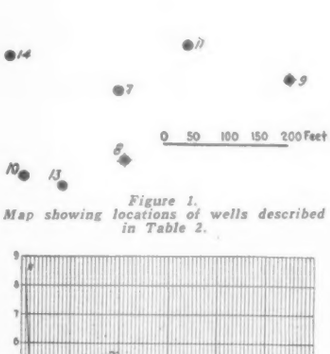


Figure 2.
Oil-production curves of wells shown in Figure 1.

inished supply left to drive toward the older ones.

Effect of Previous Natural Production

Possibly the most widely used criteria for determining the value of an unflooded property are its natural production history and the results obtained from flooding on adjoining leases. Properties on which the wells had a large initial production and have maintained a slow decline are ordinarily better adapted for flooding purposes than properties on

Figure 3.
Map Showing Location of Richburg Sand-Core Well on Lot 40, of Reed Farm of Forest Oil Corp., Richburg Pool, Bolivar Township, Allegany County, New York.

which the initial production was small or the natural decline of production rapid.

A large initial production combined with a slow decline indicates a fairly permeable sand of uniform porosity and saturation, which is a most favorable condition for successful flooding. Where the initial production of wells was large but the decline in natural production rapid, it is probable that a part of the sand is exceptionally permeable, and the rest of it is relatively tight. This one part or horizon could not maintain a large production for any length of time, consequently the oil in it is practically exhausted within a short time while large volumes of oil remain in the tighter parts of the sand. Such a condition is somewhat unfavorable for flooding because at least part of the water will naturally follow the line of least resistance through the more permeable part of the sand, where the extraction of oil has been much more complete, leaving a smaller amount of water to affect the rest of the sand, where less oil has been removed and the present saturation is greater. Where the initial production was small but a steady production has been maintained, it is probable that the sand is uniformly tight—a condition that would tend to retard flood movement. Low-porosity sands are being successfully flooded by using force pumps to apply additional water pressure. In the Allegany fields, tests of the Allentown sand have shown a porosity of 7 per cent. This sand is being economically flooded by the use of high water pressures.

The recovery of oil from several representative properties in the Bradford Field by natural production methods has amounted to approximately 4,200 bbls. per acre with a well spacing of one well to 4.50 acres. Closer spacing has given a greater recovery per unit area. A comparison of the results obtained by flooding on properties which were extensively developed under natural conditions of production and on those that were only partly drilled indicates that better results may be expected from flooding on an incompletely developed property, if the sand conditions are favorable. In many cases, only the boundary locations were drilled, and on a property developed in such a manner there must be a greater amount of oil left in the sand than there would be where there had been more extensive operations.

Recovery by Flooding Process

In connection with this recent paper on water flooding, Umpleby has presented an authoritative statement of the results obtained in the Bradford Pool. The figures he gives are taken from the production records of widely separated properties, and, in so far as the author knows, are entirely fair and representative of the field. The ultimate recovery of oil by water flooding or by other rejuvenation methods primarily depends on amount of oil available in the sand. Unfortunately, there are few data on the saturation of the oil sands of this region. Fettke has logically questioned an assumption of complete saturation of the Second sand of the Venango group. Melcher has estimated that from 30,000 to 35,000 bbls. of oil per acre are left in the Bradford sand by the methods of oil recovery now practiced. These figures are based on a study of a core of the Bradford sand taken at Custer City, Pa., from an unwatered area and with the assumption of a complete saturation of oil, and from the oil and water content of a core from the Richburg sand, near Bolivar, N. Y., which was taken in what was supposed to have been watered-out territory. The location of the Richburg sand-core well with reference to the surrounding wells is shown in Figure 3, and the records of these wells are given in Table 2.

TABLE 2.—RECORD OF CORE WELL AND ADJACENT WELLS, RICHBURG POOL*

Well No.	Thickness of Sand, Ft.	Date Completed	Date Abandoned	Total Oil Production, Bbls.	Prodn. of Oil in Bbls per Ft. of Sand
22	45	March 15, 1923	May 26, 1925	8,080	179.55
23	48	March 24, 1923	Oct. 28, 1926	8,710	181.45
24	31	March 24, 1923	Jan. 21, 1926	5,715	184.19
27	40	Sept. 22, 1924		To Jan. 1, 1927 525	13.13
01	37	Sept. 26, 1922	Water-intake well		
02	37	Oct. 5, 1922	Water-intake well		

*Wells are on the Reed farm of the Forest Oil Corp., Bolivar Township, Allegany County, New York.

The Richburg sand at this locality is very uniform in lithology, the only important changes in character being variations in thickness. The porosity of a piece of this sand, as given by Melcher, is 21.3 per cent. The total production of the wells corresponds remarkably well to sand thickness although the time required to deplete the sand surrounding them varies in the same manner as on the Keller property. Apparently, the flood is moving faster toward the thicker parts of the sand. Well No. 24, which has the thinnest sand, was pumped for a longer time than the wells which have a thicker sand, before it reached the economic limit of production. It is impossible to calculate the flooded area by Herold's method, because all of the original producing wells are abandoned, but the fact that some oil has been obtained from No. 27 indicates that not all of the available oil has been removed from the area between the water-intake wells, which is in conformity with his theory. Although the core well shows that the flooding pattern used on this property is giving very satisfactory results, because the amount of oil produced from it has not been sufficient to make it economical to redrill the area between the original water intakes, it seems that its location should have been made more nearly along a line between a water-intake well and a producing well in order to show the effectiveness of flooding. Such a location would be along the long axis of the ellipse, which would be the line of greatest water movement. No. 27 has produced a great deal of water ever since it was drilled, which is only to be expected considering its nearness to two water-intake wells.

Star-Shaped Area

The star-shaped area of sand containing unrecovered oil, which Herold has described, is probably a more important consideration along the original flood line than in later rows of wells. A well drilled according to a triangular pattern beyond the first row of producing wells will show the effect of flood pressure, and can be expected to produce water long before the first row of oil wells is abandoned. The pumping of a second row will tend to establish a trend of fluid movement that will pass between the first row of producing wells, and in this way much of the oil, which might be trapped by two advancing banks of water moving in opposite directions, is recovered.

Ordinarily, the cuttings of sand from wells drilled into unflooded sand will give a heavy scum of oil when washed with hot water. Various operators have reported that where a well has been

drilled into the sand behind the flood no oil can be washed from the cuttings. This has been corroborated in several instances by the author, who has inspected the sand from wells drilled in watered-out areas, which gave no indication of any oil remaining in the sand. Such wells when pumped yield large volumes of water and practically no oil. This condition is apparently contradictory to our previous conceptions of the oil content of the reservoir rocks. If 60 per cent of the oil is left in the sand after flooding, it would seem that in drilling 30 feet of sand with a 6.25-inch hole some evidence would be found of the remaining oil. However, assuming a porosity of 15 per cent and 50 per cent oil saturation, there would be only about 4.50 gallons of oil in the volume of sand drilled, or 0.15 gallon per foot of sand. This, of course, is a relatively small amount, and it may be so tightly attached to the sand grains that it would hardly be recognized except by careful laboratory tests. It is somewhat doubtful whether it could be reclaimed even by very long continued pumping.

Favorable Characteristics of Oil Sands

The more or less widespread opinion that water flooding can only be successfully practiced in the Bradford and Allegany Fields is certainly erroneous. Water flooding is being used with excellent results in several other Appalachian fields but, on account of legal restraints, details of its use have not been published. It is, however, true that, in several instances, water flooding has not yielded results comparable to those that have been obtained in the Bradford Field. Where an adequate supply of water is available, the deciding factor in the results that may be obtained from water flooding appears to be in the lithologic character of the reservoir rock. Sands of high porosity but relatively low permeability, due to a small size of pore space, appear to be best adapted to water flooding. For this reason, a fine-grained sand with correspondingly minute pore spaces would probably be more favorable than a coarse-grained sand, which, although possibly possessing a much higher permeability, may be of much lower porosity than the fine-grained sand. The amount of oil held in a sand having fine pore spaces, after a long period of natural production, is probably greater than in a sand of large pore spaces, due to the greater opportunity for the adherence of the oil to the sand grains, and the higher frictional resistance of a sand of low permeability to fluid movement. In a sand of high permeability, the resistance to fluid movement is so reduced that sands of this type are not only more thoroughly drained of their original oil content by natural methods of production, leaving a smaller amount of oil available to be reclaimed by some process of rejuvenation, but they also will allow for such rapid migration of the flood water that much oil might be by-passed with a resulting inefficiency in the flooding operation. The application of water flooding may be restricted therefore to certain sands, but it is believed that its successful use is not confined to the Bradford and Allegany Fields. That it is an economical and practical method for increasing oil recovery in this region cannot be questioned. (In this connection, it might be noted that the quality of oil in the sand may have a decided bearing on the success of a water flood. It is believed that the light, low-viscosity, Pennsylvania grade oils are better adapted to this method of oil-field rejuvenation than certain of the heavier asphalt or mixed base crudes.)

Reflooding with Compressed Air or Gas

The recovery of the large amount of oil that is believed to remain in the sand after flooding is a problem of great interest and importance. Small accumulations of oil that may occur in irregularities in the top of the sand might be displaced by the use of compressed air or gas. Gravitational separation has probably been responsible for their origin, and, if air is introduced into the sand, it might be expected to act according to the same law, occupying the upper part of the sand, and pushing away oil and water that have collected there.

Use of Additional Water Pressure

During 1926, much larger oil recovery has been obtained on certain tracts in the Richburg Pool, New York, by the application of extra water pressure by means of force pumps, in what was considered to be watered-out territory. On one tract the average daily production of oil from 10 wells has been increased from 3 bbls. to 27 bbls. by increasing the hydrostatic pressure on the sand by 200 pounds. The results from the use of extra pressure may be attributed to several causes. Under a fixed pressure head, the sand will take a more or less constant volume of water. Should the sand possess considerable vertical variations in permeability, the capacity of the more permeable parts to take water might be sufficient to prevent much flooding through the less permeable parts. Since changes in the capacity to take water is not a constant function of variations in the pressure head, an increase in water pressure may be sufficient to cause water movement through the less permeable and possibly unaffected parts of the sand, while still supplying a volume of water adequate to meet the capacity of the more permeable parts under the same condition of increased pressure. As the pressure is increased, the effective area of flooding action expands horizontally, consequently accumulations of oil in certain parts of the sand area between the water-intake and producing wells, which may originally have been unaffected by the flood, are displaced.

Soda Ash Process

The use of sodium carbonate in the flood water for increasing oil recovery is being tried on several properties in the Bradford Field. Results from its use have been slow in appearing. Like any new process, it may require considerable time to determine the best field methods for its application and the conditions that will be most favorable for its action. A slow penetration of the sand by the soda solution is certainly desirable. At the present time, it is one of the most important experiments in oil-recovery work that is being carried on in the Bradford Field, and, should it prove to be successful, it would undoubtedly be possible to reflood much of the present watered-out territory with a soda solution.

Some of the conclusions that have been presented in this paper might well be questioned on the ground that the examples cited do not begin to cover the large combined area of these fields. To a certain extent, such criticism may be justified. It has not been the author's intention to imply that the geologic conditions that have been described will be met throughout the region, but it is his desire to emphasize the possible advantages which may be gained by more efficient flooding where these conditions are known to occur. It is only natural to select for study localities where reliable records may be obtained, and it is believed that the studies upon which this work has been based include a majority of these. Oil-field rejuvenation still presents many unsolved problems, and it is freely acknowledged that the data available at the present time form only a beginning of a better knowledge of methods for increasing oil recovery.

OVERPRODUCTION CAUSE OF YEAR'S CHANGES

(Continued from Page 179)

the use of natural gasoline in export motor fuel has held up well of late, due to the increased overseas shipments of gasoline.

The refiner of not so many years ago processed crude oil for the kerosene it contained and made little attempt to save the lighter fraction. A parallel may be drawn in the natural gasoline industry today, as the manufacturer is saving the heaviest products and allowing the light, volatile material to escape. In the short space of a few years, research in the natural gasoline industry has discovered that the light ends of natural gasoline can be converted into products, such as alcohols, and that they can also be used directly or indirectly as fuel.

These new uses for natural gasoline, together with a small but growing demand for use in aviation gasoline, are the chief rays of hope for the natural gasoline manufacturer.

ADVANCE IN CRUDES AIDS GASOLINE PRICE

(Continued from Page 28)

firmer because of its greater value as a cracking stock and the firmness of the gas oil market has been apparent since the start of the advance in gasoline prices.

Lubricants showed no tendency to advance, although their position is strengthened by the posting of the higher crude prices. With consumption relatively low, the advance is likely to be slow in coming. Cylinder stocks displayed added weakness and the spot market was being supported principally through export purchases made at substantial price concessions. Only a limited number of refiners are running a suitable crude to make cylinder stock and many of these are manufacturing bright stocks in preference to making steam refined stocks so the production of the latter is limited, but despite this there is plenty available and no advance is contemplated as a result of the higher crude prices.

Wax showed a firmness that has characterized that market for the last three weeks Prices have not been advanced as much as was thought probable by some refiners several weeks ago, but the resistance to higher prices is slowly becoming less and the market is in a better position to continue to advance fractionally than at any time in the past when efforts were made to push the price to 3 cents.

Gasolines and Naphthas

The weighted average price for 58-60 U. S. Motor gasoline at .06211 shows an advance and while some material was still being quoted below 6 cents to jobbers these jobbers were customers of long standing, and these sales do not represent the bulk of the trading. Six cents was the bottom price at which the great bulk of the trading was done. A widening differential between the U. S. Motor grade and the higher gravities is apparent as a result of the increased cost of natural gasoline. The average price on the 60-62, 400 end point gasoline is shown as .06690 cents and the average for the 64-66, 375 end point at 07250 cents.

Kerosene and Distillates

The kerosene market has remained inactive and prices tended to weaken as only a small amount of business was done. There were reports of inquiries being made for material at 3⅞ cents but no one was willing to sell at that price. There was some material moved for export at 4 cents but the low of the spot market was 4⅛ cents with some refiners getting 4¼ cents and moving a fair share of their production.

Distillates have not been active for several weeks and the shipments are showing a gradual decrease in number as the summer season is approached. Some refiners had anticipated a greater demand and stored large volumes of distillate, part of which is still on their hands. Prices vary in accordance with the quality but in general prices have been weaker, the greatest weakness being shown in the untreated high flash grades.

Natural Gasolines

There was only a normal amount of trading done over the week and prices remained unchanged. The BB grade showed the major change as it was generally quoted ¼ cent below last week's price. The falling off in shipments to the Gulf over the past few weeks has lead manufacturers to anticipate new inquiries from there for March shipment and they are optmistic regarding the outlook for March. In the meantime the demand is doing no more than taking care of the material offered on the open market.

Gas Oil and Fuel Oil

While gas oil prices are generally unchanged, they are firm and are expected to advance. The low cold test grades continued to demand substantial premiums but there was less of this material moved as a result of the moderate weather throughout the northern territory.

Fuel oils showed strength as some refiners reported their production sold for the balance of the month and were not willing to lower prices to move stocks.

No material was available below 75 cents and while the higher gravity oils showed similar advances, the bulk of the inquiries were for the low viscosity heavy fuels.

Lubricants and Wax

The lubricant market showed practically no change. Cylinder stocks were weak and prices ranged over a wide field. Export purchases continued to serve as a substantial outlet and relieved stocks. Wax was generally quoted at 2⅞ cents for future shipment and the 2¾-cent material was becoming scarce. Refiners were anticipating a 3-cent market within a week.

Big Registration At Opening Session A.I.M.E. Meeting

NEW YORK, Feb. 20.—The one hundred thirty-sixth annual meeting of the American Institute of Mining and Metallurgical Engineers opened here today with a registration of over 800. The meeting held even greater interest for the oil industry than ever before. In addition to regular scheduled sessions of the petroleum division, there was also a conference on problems of overproduction in the industry and a session devoted particularly to geophysical prospecting at which E. L. DeGolyer, president of the Amerada Petroleum Corp., and the Geophysical Prospecting Co., discussed the various methods.

It was brought out that six salt domes had been discovered in the Gulf Coast area by geophysical prospecting some of which have proved commercially productive of sulphur and oil.

Opening sessions of the petroleum division brought out unusually heavy attendance. Outstanding topics of discussion among members were overproduction and possible legislation. Technical problems in refining and production which will occupy the greatest part of the time of the meeting are considered by many members as the base of any solution of existing troubles of the oil industry.

CRUDE PRICE CHANGES

(Continued from Page 182)

87 cents, with a 2-cent differential per degree , to 32 gravity and higher at 95 cents.

Standard Oil Co. of Louisiana posted the new Mid-Continent schedule on north Louisiana and Arkansas crudes with the exception that all oil below 28 gravity is posted at 91 cents.

Midwest Refining Co., effective February 21, reduced its posted schedules on all but one grade in the Salt Creek Field of Oklahoma. The base price on crude oil of 29-29.9 gravity was reduced from $1.14 to $1.01. The top grade of 37 gravity and above was posted at $1.31. The former price was $1.30 for the top grade.

YATES POOL MARKETING LEADS TO LITIGATION

Operating differences caused by varying opinions about the marketing of oil produced on the valuable Yates Pool property owned jointly by the Mid-Kansas Oil & Gas Co. and the Transcontinental Oil Co. has led to the Transcontinental company applying to the Texas courts for an injunction against the Mid-Kansas to prevent the latter from interfering with the Transcontinental marketing its 50 per cent share of the output of the leases owned by it.

These companies jointly own the oil and gas mining leases upon the Yates ranch upon which the first production in Pecos County Pool was found, and they have operated harmoniously until the present time, according to reports. Diverging views about the disposal of the oil produced, has led to the legal action mentioned above.

Gas Lift Operations in California Field

Central Plant Type Favored by Major Companies With Resultant Savings. Interesting Data on Repressuring

By A. N. Bell*
Chief Production Engineer, Marland Oil Co.

The gas lift installations of the major companies in California have been of the central plant type wherever field conditions would permit. This has resulted in greater flexibility and lower installation costs per well than could be obtained with individual well units. If the field conditions are carefully analyzed and the plant designed with the idea of obtaining high operating efficiencies, the installation cost per well can be lowered sufficiently to compare favorably with individual well pumping units, when the operating advantages are considered. Much greater production per horsepower can be obtained with the gas lift than is possible with pumping equipment.

A survey of the amount of gas theoretically required to lift a barrel of oil under different conditions of submergence as compared with the capacity of a compressor engine at the different pressures required will determine the most economical pressure and submergence from an installation and operating cost standpoint. However, a casual investigation seems to indicate that greater percentages of efficiency are obtained with the high pressure lifts using smaller tubing and greater submergences, so that the actual pressure for best results is slightly greater than indicated by purely theoretical requirements.

In a comparison of several wells in which all conditions are nearly equal except submergences, the gas-oil ratios show a decrease of 25 to 50 per cent with a change in operating pressure from 300 to 450 pounds.

There is very little to be said about the method of equipping wells for the gas lift which has not already been covered. The practices of setting the traps above the derrick floor, eliminating right angle bends and horizontal lines, etc., have been adopted by the various operators, each layout having its merits. There are practically no examples of wells being flowed between the casing and tubing as this method is not considered conducive to good results by the major operators. Natural gas in most cases treated is used in all California gas-lift plants.

Operating Results

The results to date obtained from the principal gas-lift installations have been in favor of the gas lift over pumping with rods. Unfortunately, however, operating costs are not available for publication.

The only serious disadvantages of the gas lift which are found to be general are as follows:

1. Emulsions—Due to the agitation of the fluid, wet wells produce an emulsion which is very viscous and difficult to dehydrate. There have been several examples of wells which produced emulsions so viscous that they would not flow from the gas traps and the wells had to be taken off the gas lift and put "on the beam."

2. Gas Supply—After the fields have passed the flush stage there is usually a shortage of gas due to lease fuel requirements and the shrinkage in gasoline plant operations. The chief disadvantage of the use of air or flue gases is the loss of gasoline plant revenue, which is an important item in most California fields.

3 Back Pressure on Low Head Wells—With wells in which the fluid level is very low the effect of the gas pressure on the fluid is to retard production. This can only be overcome by using larger tubing and excessive gas circulation resulting in costs out of proportion to the production of the well.

Advantages of Gas Lift

The most striking advantages of the gas lift are:

1. Elimination of Rod Troubles on Deep Pumping Wells—Deep pumping wells have many shutdown periods due to parted rods, sanded pumps, etc. Also the wear on tubing if often excessive due to crooked holes. With the gas lift there are no moving parts at the well to require operating attention or cause wear or breakage. The compressors when grouped in one plant have the constant attention of a skilled operator, which should result in longer life of the machinery.

2. Increased Daily Production—Numerous data have been compiled showing increased daily production, but insufficient time has elapsed since the general use of the gast lift for ultimate yields to be available. However, assuming ultimate yields equal to other producing methods, the removal of the oil in a shorter space of time would result in greatly reduced operating costs.

3. Lowering of Oil-Gas Ratios—During the flowing life of a well, the oil-gas ratio may be reasonably controlled by beaning, variation of tubing sizes and depths, etc., but at best these ratios are usually high.

Example Is Cited

When a well is placed on the gas lift lowering of formation gas-oil ratios usually results. In a well in which the gas was introduced while the well was still flowing, the result was a slight increase in production and a marked decrease in the formation gas-oil ratio, together with a slight decrease in the casing pressure. With the tubing depth unchanged, the well started taking gas as soon as the line pressure equalled the casing pressure. The casing pressure did not drop much below its normal trend after the introduction of the gas, the slight break shown on the chart being due to a change in beans on the well.

The immediate drop in the formation gas-oil ratio was apparently due to the change in rate of production and the fact that the introduction of gas eliminated the necessity of gas for lifting purposes by-passing the oil to enter the hole. The continued decline in back pressure possibly had some effect in further reducing the gas-oil ratio, but it will be noted that the same gradual drop in casing pressure prior to the introduction of gas was accompanied by an increase in the gas-oil ratio. On this property the gas lift has been uniformly successful in reducing gas-oil ratios of wells producing from three different sands of different characteristics. In every instance the effect of the gas lift has been to moderately reduce back pressures, but the reduction of back pressures by changes of beans or natural decline did not have the same effect on the wells while flowing. It is the opinion of the writer, based on these and other observations, that effective back pressures on the sands are not the only factors responsible for variations in gas-oil ratios. Steady rate of flow is undoubtedly important, and it is also indicated that in flowing wells excess gas comes into the well with the oil because of its requirements for lifting the oil in the tubing. This is brought out more clearly in a heading well in which the fluid rises rapidly in the casing and then waits for sufficient gas to accumulate to start the well flowing.

It is interesting to note that one company has not generally experienced a drop in formation gas-oil ratios in wells placed on the gas lift. This company uses large tubing but has held the circulated gas to a minimum. Decreased ratios have been noted, however, when the circulated gas is increased. It therefore appears that the use of tubing small enough to prevent slippage and to require only a reasonable amount of gas circulation with normal friction is necessary to secure definite results in lowering formation gas-oil ratios even though the daily production is slightly lower. These methods coincide with those recommended above as a means of securing greater mechanical efficiency.

There has been considerable discussion regarding the use of the gas lift as a means of varying back pressure, but these variations are limited to a narrow range unless beaning is resorted to. When a well is on production with certain size tubing, it is not always practical to shut down and change tubing sizes and with a given tubing size suitable for good operating efficiencies, the writer has not found it possible to appreciably vary the back pressure on the sand either by raising or lowering the tubing or by varying the amount of gas circulated. Lowering the tubing increases the operating pressure in approximately equal amounts to the decrease in fluid head. Increasing the volume of gas circulated increases the friction to offset the benefits of increased aeration.

4. Result of Lowered Gas-Oil Ratios on Uultimate Yields—The gradual increase in production of the well mentioned above was not caused by any variation in the amount of gas circulated or change in well equipment. The results of this well indicate a much greater ultimate yield than would normally be expected from a well of its initial output, and in addition shows the value of a high pressure plant for use of the gas lift early in the life of the well. An exactly similar condition was noted in the adjacent well which was put on the gas lift at the same time.

The next adjacent well (upstructure) was not put on the gas lift but its production steadied and climbed slightly after the installation of the gas lift in the wells mentioned above.

These examples indicate that the conservation of gas in any one or more wells helps all of the wells in the same sand to produce more oil.

Recent reports indicate that it is the consensus of opinion of engineers in all parts of the country that ultimate recoveries can be increased by the conservation of gas during the early life of the wells. This cannot be proved until new fields, now being developed with gas conservation in mind, have reached depletion. However, if the theory is accepted universally and the gas lift can be proved to reduce oil-gas ratios, the result should be obvious.

Improvement of Equipment

During the past five months, the Marland Oil Co. of California has been trying a new device called a "fluid displacement pump," which has shown very encouraging results and is now being tried by several other companies. This device is run on the bottom of the tubing with either a packer or double string so that no gas pressure can reach the fluid. The fluid rises in the tubing through a valve until it approaches its static level and ceases to have sufficient upthrust to overcome the gas pressure exerted downward on the smaller gas valve, thereby opening the same and seating the oil valve as both are on the same item. The gas which is introduced between the casing the tubing enters the gas valve and lifts the column of oil in the tubing. When the top of the column of oil reaches the surface the gas starts to expand reducing its pressure so that the upthrust of the oil again opens the oil valve and seats the gas valve, repeating the operation. The results obtained with this device to date indicate that it or some similar device will go a long way toward solving many of the present difficulties in gas-lift operations.

As a means of showing how improvements to the gas-lift methods may solve many of the present problems, the following notes are given on the advantages of the "fluid displacement pump" tried out on the Marland properties:

1. Reduced Volume of Circulated Gas Required—On one gas-lift well the gross gas-oil ratio was reduced from 1,227 to 424. This was typical of results on several wells.

2. Reduced Viscosity of Emulsion—Due to the fact that the gas does not mix with the oil to any great extent, the emulsions are less viscous and less stable.

3. Increased Production—Wells changed from ordinary gas lift to "fluid displacement pump" have shown increased production. This is due to elimination of gas pressure on the fluid.

4. Better Control—Due to the automatic control of the gas entry into the tubing, the flow of gas is easy to regulate without the use of other control devices.

In the opinion of the writer, two very important problems facing the production engineer at present are as follows:

1. To develop a safe and economical method of starting the gas lift early in the life of wells flowing with high casing pressures.

2. To develop a method of producing small wells on gas lift so as to compete with the operating costs of pumping methods.

Repressuring

The results of repressuring (or gas drive) have been very encouraging to the several companies doing experimental work along these lines.

The most notable examples in California are the Shell and the Union Oil companies at Dominguez, the Marland Oil Co. at Seal Beach and the California Petroleum Corp. at South Mountain.

The results of the Marland test at Seal Beach are interesting in that repressuring was started while several wells were still flowing. It is also interesting on account of the high pressures required to overcome the hydrostatic pressure exerted by high head edge water.

The well first chosen for repressuring is about half way up the flank of the structure and had been on the beam making about 250 bbls. of fluid daily, cutting about 60 per cent emulsion. The fluid level was 230 feet from the surface and the top of the sand was 4,393 feet. Tubing was run to 4,000 feet with a packer and the space above the packer filled with water to balance the high pressures.

Gas was started in slowly to allow the fluid to be pushed back into the sand, and required three days at a pressure of 1,500 pounds per square inch before starting into formation. The pressure was once built up to 1,800 pounds and the compressor was shut down for a few hours. When again started, the well took gas at 1,500 pounds, and after about three weeks the pressure was dropped to 1,450 pounds. The present pressures required range between 1,400 and 1,450 pounds. Volumes as high as 1,500,000 cubic feet per 24 hours were put into the well.

Increases as high as 50 per cent in production were obtained in wells upstructure with very little increase in wells down-structure. Also, the water cut on one edge well materially decreased. After about 40 days the repressuring

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was moved to two wells farther down-structure and the well originally repressured was put on production. The result of this was a great increase in the production of wells one location farther down-structure, a rapid increase in one well one location up-structure, and a decrease in production of the wells farthest up-structure. Later the gas started to shortcut to the nearest well down-structure, nullifying to a certain extent the effects of the repressuring work. The increased production which could be definitely attributed to the repressuring work amounted to 1 bbl. for each 495 cubic feet of gas introduced, and the increased gas production amounted to about 80 per cent of the gas introduced.

Interesting Features

The interesting features of repressuring work as encountered in the various projects in California, and which appeared similar in all of the projects are as follows:

1. A rapid increase in production occurs during the first few months of repressuring with a falling off to a point slightly above normal after which usual declines continue at a fixed figure above normal production.

2. The usual tendency is for the gas to travel up-structure and show the greatest increase in up-structure wells. Selection of several edge wells for a concerted drive up-structure is more advantageous than so-called "five-spot locations."

3. The greatest danger to successful results is from channelling of the gas to some nearby well which increases rapidly after once starting.

4. In the average California field, the effects of repressuring will extend several locations, preventing its use on small properties except by co-operative efforts.

5. Pressures higher than formerly thought economical or safe can be used if equipment is properly designed.

6. Repressuring steadies the flow in gas-lift wells greatly enhancing the value of gas-lift operations.

7. In coarse-grained sands the effect of repressuring travels far enough to indicate the possibility of greater well spacing than would otherwise be considered necessary, using the gas drive to drain the intervening areas. The reduced cost of such a program is self evident.

Late Fields

(Continued from Page 39)

Hendricks, Section 28, Block B-5, southern part of Hendricks Pool, was shot with 30 quarts at 3,049-57 feet and 420 feet of oil rose in the hole in 3½ hours. The well is to be shot with 100 quarts at 2,820 to 2,914 feet.

EAST CENTRAL TEXAS

MEXIA, Tex., Feb. 18.—Since the discovery of oil in the Boggy Creek Dome in Cherokee County, four salt domes in the East Central Texas area have been proven by the drill, but none of them developed for oil. The latest one is the Whitehouse Dome in Smith County, where the Humble Oil & Refining Co. has topped the anhydrite at 485 feet, which has heretofore been a sure indication of the salt beneath. Other domes developed were the Bethel Dome in Anderson County by the Pure Oil Co., Sand Flat Dome in Smith County by the Roxana Petroleum Corp. and the Bullard Dome in Smith County by the Humble Oil & Refining Co. There are five or six other supposed domes discovered by means of the seismograph which have not yet been proven by the drill.

Harrison and others deepened their No. 1 Williams, on the Varella Survey, in Limestone County to 2,956 feet, where there was a small showing of oil. It was tested, but bailed dry. In the same county, Alexander & Liles will drill a test northwest of Kosse and near the Trinity sand test of the Pandem Oil Corp., which was abandoned. The operators have about 200 acres. The Humble Oil & Refining Co. completed their block by giving them 80 acres with the understanding that the test would be drilled. It is believed here that it will be a Trinity Sand test, but this is not confirmed by the interested parties.

The Transcontinental Oil Co. is drilling a test on the Ward 40 acres in the Cedar Creek district in Limestone County. It is located 300 feet east of No. 1. The new well has Woodbine sand at 2,868-70 feet. Pipe was set at 2,867 feet. There was a good showing of oil.

The Magnolia Petroleum Co. has bought two 55,000-bbl. tanks in the Powell Field from Collins and others and is filling them with West Texas crude oil.

SECURITIES REFLECT ADVANCES IN CRUDE

(Continued from Page 184)

gible drilling costs and a heavy writeoff for inventory adjustments, approximately $5,400,000, before deductions for depletions and depreciation."

Paragon Refining

Operations of the Paragon Refining Co., Toledo, Ohio, during 1927 resulted in net addition to surplus of $311,826; E. W. Edwards, president of the company, has informed stockholders. The annual meeting will be held in Cincinnati, Ohio, March 1. Depreciation charge-offs totaled $384,961; additions to fixed assets, mainly through plant improvements, amounted to $653,156, and outstanding car trust certificates constitute the only obligation other than current at the close of the year. The company was able to finance improvements without recourse to permanent financing, Mr. Edwards stated, and at the close of the year the ratio of quick assets to quick liabilities was 2.62 to 1, or approximately the same as at the end of 1926. Installation of two Dubbs cracking units which went into service in May facilitated the good showing for the year, Mr. Edwards declared.

White Eagle Co.

The comparative income account of the White Eagle Oil & Refining Co. for the years ended December 31, 1927, and 1926 shows:

	1927	1926
Net sales	$16,356,295.79	$19,218,500.99
Cost of sales	10,953,569.19	13,019,550.04
Gross profit on sales	$5,402,726.60	$6,198,950.95
Selling, general and administrative expense	2,780,947.08	2,642,313.43
Net profit from operations	$2,621,779.52	$3,556,636.52
Deductions from income (net)	489,838.74	412,600.45
Net income before depreciation, depletion and federal taxes	$2,131,940.78	$3,144,036.07
Deduct:		
Depreciation	$878,971.26	$809,727.67
Depletion	380,245.09	867,588.55
	$1,259,216.35	$1,177,316.22
Net income before federal taxes	$872,724.43	$1,966,719.85
Reserve for federal taxes	.....	115,000.00
Carried to surplus	$872,724.43	$1,851,719.85

Sun Oil Co.

Sun Oil Co. reports for year ended December 31, 1927, net profit of $2,791,057 after interest, depreciation, depletion and federal taxes, equivalent after 6 per cent dividend requirements on preferred stock, which was created in May, to $2.20 a share earned on 1,197,934 no par shares of common stock. This compares with $3,358,899, or $2,86 a share on 1,171,145 no par shares of capital stock in 1926.

Income account for 1927 compares as follows:

	1927	1926
Gross	$48,716,819	$50,797,798
Expenses, etc.	*43,370,851	45,209,063
Balance	$5,345,968	$5,588,735
Other income	834,381	1,499,797
Total income	$6,180,349	$7,088,532
Interest	534,356	552,330
Depreciation and depletion	2,854,936	2,785,303
Federal taxes	.....	392,000
Net income	$2,791,057	$3,358,899
Preferred dividends	150,000	.....
Common dividends	1,165,671	1,100,375
Surplus	$1,475,386	$2,258,524

*Includes federal taxes.

Standard of New Jersey

The Standard Oil Co. of New Jersey declared the usual extra dividend of 12½ cents a share and regular quarterly dividend of 25 cents, both payable March 15 to stockholders of record February 25.

NEW PLAN PROPOSED FOR SEMINOLE AREA

(Continued from Page 30)

Benefits of Plan

The combination of circumstances in Township 7-6 seem to demand that some sort of modified drilling plan will be the most acceptable and the most satisfactory to all parties concerned. By slowly testing out the region by the Pringle plan, a much better idea of the structural situation will be available, and the added knowledge should prevent the operating companies from drilling some 30 or 40 dry holes which could very easily occur if the area were thrown wide open to the drill.

The matter of permitting the Reiter-Foster Oil Co. to drill a well upon its lease in Section 14-7-6 was discussed, and although many were opposed to the starting of this well, it was announced that the Reiter-Foster company had decided to start on March 1. The proposed Reiter-Foster well is located just a quarter mile north of the Independent Oil & Gas Co. and Highway Oil Co.'s well in Section 23-7-6. Cobmenting upon the starting of the Reiter-Foster well, E. H. Moore, president of the Independent Oil & Gas Co., and one of the prime movers in the early efforts of the Seminole shutdown move, said: "I am not afraid of the Reiter-Foster company or any other company drilling all the wells that they can afford to pay for. Our company has a lot of acreage in this territory, and we are not sure that all of it is good. We have held back drilling mainly because we did not want to drill, and I believe that if the truth were spoken, that's the same reason that the majority of you have held off on drilling. I would like to see the plan of starting test wells go into effect. Let's find out just what underground conditions are like in this area. There are many who talk about the field being a potential market breaker, but I feel that it is not, and believe that many of you really have the same conviction. We have talked about this region being a menace to the market. Let's drill the test wells and find out."

Jack Shannon, general manager of the Snowden & McSweeney interests echoed the sentiments of Mr. Moore, and said that he failed to regard the 7-6 area as a market-breaking region.

Mr. Pringle remarked that it seemed unfair to shut down drilling in the Greater Seminole region while Lost Springs, Burbank and all other parts of the Mid-Continent Field registered a normal activity, and for this reason would like to see the 7-6 country carefully developed.

Urges Conservation

T. B. Slick, the largest independent oil producer in the Mid-Continent area, made a strong plea to continue the shut down indefinitely, and once more urged his plan of starting one well to each 40-acre tract of lease. He said that it was immaterial just how many wells were drilled on the forty, that that was a matter of individual judgment, but he pleaded for the starting of one well to each 40 acres. He explained that there was really no profit in the mad rush of operations which were designed to get a few barrels of the other fellow's oil, and stated that if a slow and limited drilling plan were adopted, it would prevent the waste attendant upon the drilling of 50 dry holes. He also stressed the importance of discovery rights, and made it plain that he was in favor of granting both the Independent Oil & Gas Co. and also Snowden & McSweeney full advantage for drilling in their discovery wells in the two regions of Little River.

R. M. Young, president of the Carter Oil Co., moved that the present shut down plan in all outside regions be made effective until May 1, and that the umpire and the advisory committee be directed to work out plans for the equitable operation of the 7-6 country. This motion received a majority of the votes present, and was carried. There were some companies interested who were not present at the meeting, and their vote will be necessary to make the continuation effective. The Amerada Petroleum Corp. and the Sinclair Oil & Gas Co. voted against the extension of the shut down in outside regions, and the following companies reserved their vote: Gypsy Oil Co., Minnehoma Oil Co., Roxana Petroleum Corp., T. B. Slick and The Texas Company.

The umpire and the other members of the advisory committee will meet later in the week and work out the details of the new Little River plan, and very likely another meeting to ratify this plan will be called within the next week.

MARLAND ANNOUNCES CHANGE IN OPERATIONS

PONCA CITY, Okla., Feb. 18.—E. W. Marland, president of the Marland Oil Co., announced a change in the operating plan of the subsidiary concerns of his company, and also announced the resignation of three of his officials. According to the announcement, John S. Alcorn and J. K. Cleary, vice presidents, and Seward R. Sheldon, treasurer, have resigned, and will not submit their names for re-election at the coming stockholders meeting which will be held in May. These resignations come close after the retirement of W. H. McFadden, senior vice president, and W. A. J. M. Van der Gracht, vice president in charge of geological research work.

The change in operating management, according to the announcement is that in the near future, all three operating subsidiaries of the Marland Oil Co. of Delaware (the parent company) will be combined into one concern which will be called the Marland Production Co. The officers of the Marland Production Co. will be E. W. Marland, president, and C. C. Brown, vice president and general manager. Probable directors of the new concern are A. W. McCoy, J. R. McGinley, W. A. Moncrief, T. L. Golay, I. G. Harmon, G. G. Shallenberger and R. E. Clark. These names include officials of the Marland Oil Co. of Texas, the Marland Oil Co. of Oklahoma, and the Marland Oil Co. of Colorado. The headquarters of the Marland Production Co. will be at Ponca City, Okla.

In accepting the resignations of the three officers who are leaving the company Mr. Marland wrote in part: "I have already conveyed to you personally my profound regrets at the loss of your business association, but I recognize the fairness of your position, and I cannot ask you to sacrifice any longer your personal interests and the opportunity for advancing your personal fortunes. My best wishes for your success in your private business are with you, and I hope for a continuation of our personal friendship for the rest of our lives."

Messrs. Alcorn, Cleary and Sheldon have announced that they will continue to reside in Ponca City, and will engage in the oil business as individuals.

SCOUTS ASSOCIATION MEETING

SHREVEPORT, La., Feb. 20.—A meeting of the executive committee of the National Oil Scouts Association has been called at the Jefferson Hotel, Dallas, Tex., February 25, to select the time and place for the 1928 convention. Shreveport is making a vigorous bid for the meeting either here or in Hot Springs, Ark.

Walter O'Roark of the Standard Oil Co.'s scouting department here is president of the Association and the executive committee is composed of G. W. Arnold, Pure Oil Co., Houston; P. G. Booth, Humble Oil & Refining Co., Breckenridge, Tex.; C. J. Bradley, The Texas Company, Colorado, Tex.; Joe Clingan, Roxana Petroleum Corp., Abilene, Tex.; R. O. Frame, Humble Oil & Refining Co., Wichita Falls; Ed L. Hogan, Prairie Oil & Gas Co., Corsicana; J. F. Hornbeck, Vacuum Oil Co., Midland, Tex.; J. B. Leonard, Prairie Oil & Gas Co., Eastland; C. B. McCormack, Roxana Petroleum Corp., Dallas; Gene Morehead, Simms Oil Co., Shreveport, La.; C. R. Nicholson, Empire Gas & Fuel Co., Amarillo; G. C. Phillips, Marland Oil Co., San Angelo, and Oscar Reynaud, The Texas Company, El Dorado, Ark.

Technical Questions Answered

BY CHARLES K. FRANCIS, PH.D., TECHNICAL EDITOR

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible so as to assure a satisfactory answer.

All inquiries should be signed and if other than the given initials are to be used please indicate the desired letters.

Questions involving patented processes, intricate formulas and calculations and estimates of costs, for obvious reasons, cannot be answered. The replies will appear on this page within a reasonable time.

ACTION OF ANTIKNOCK SUBSTANCES

What is the explanation of the action in a motor of the various antiknock substances which are added to gasoline? Do such substances hasten or retard the rate of combustion?—W. R. S.

There have been many attempts to prove just what happens when an antiknock substance performs in a motor; while all of the theories advanced appear to have some merit, the authorities have not accepted any specific idea, and the subject continues to be one of the foremost automotive problems. Two interesting contributions were made at the recent meeting of the Academy of Sciences, in Paris, by Dumanois and Laffitte, and in a second paper by Dumanois.

According to the first, by Dumanois and Laffite, the propagation speed of the explosive wave is not affected by the addition of tetraethyl lead to the gas mixture. The result of experiments by the authors is given in the following table, in which A indicates the formula of the mixture, B the original pressure in atmospheres, C the speed of the explosive wave in meters per second without the addition of Pb $(C_2H_5)_4$, and D the speed with such addition:

A	B	C	D
$2H_2+O_2$	1	2,800	2,850
$2H_2+O_2$	5	2,850	2,850
$2H_2+O_2$	6.5	2,900	2,860
H_2+O_2	1	1,900	1,950
H_2+3O_2	1	1,750	1,700
$4H_2+O_2$	1	3,200	3,260
H_2+O+N	1	2,400	2,400
CH_4+2O_2	1	2,350	2,300
CH_4+3O_2	7	2,320	2,350
$2CH_4+3O_2$	1	2,400	2,450

The differences are small and in either direction, and remain within the limits of experimental errors according to precision afforded by the available apparatus. Accuracy is not claimed to within 2 p. c. It is accordingly to be concluded that the practical difference is nil

It may be recalled, on the other hand, that previous research by Egerton and Gates in Great Britain showed that the addition of an antiknock substance to the gas mixture does not affect the duration of the period during which combustion remains regular, prior to the birth of the explosive wave.

These conditions negative the recent theories according to which antiknock substances, including tetraethyl lead, act by accelerating the combustion through projection of ignited lead particles. This confirms work by Moureu, Defraisse and Chaux, Pignot, Aubert, and Villey.

As explained in the paper by Dumanois, a suitable theory may be proved that during the compression period a proportion of unstable, endothermic peroxides are generated. Their decomposition, when ignition takes place, hastens the appearance of the explosive wave. The assumption that antiknocks prevent or minimize the formation of peroxides during compression would afford a convenient explanation of the delaying of the explosive wave.

As regards self-ignition through hot points in the cylinder, a fact which Dumanois has shown to be distinct from the formation of the explosive wave, peroxides are responsible for lowering the ignition temperature of the mixture. The prevention of their formation accordingly delays self-ignition. This would explain why, in increasing the compression ratio in an engine, self-ignition is registered, despite the fact that the temperature of the hot points is generally lowered, the reason being that higher compression means more peroxides.

It may also be assumed that antiknocks, while not acting on the regular or explosive period after ignition has taken place, act in lengthening the (very short) time during which contact is required between the hot point at a given temperature and the given mixture for the ignition of the latter.

While our knowledge is not sufficient at the present time to give a positive explanation of the mechanics of their action, there appears to be ample evidence that the antiknock substances function as nondetonators because they reduce the velocity of flame propagation in the motor cylinder. Also, that high flame velocities are the cause of the sudden and violent rise in pressure which produces the effect known as detonation or knocking in the cylinder.

VOLATILITY OF GASOLINE BY DEWPOINT DETERMINATION

What is the dewpoint of gasoline and how may it be related to the volatility?—A. W. J.

The dewpoint is the best indication of the temperature of complete vaporization under equilibrium conditions, of gasoline alone or mixed with air. This dewpoint may be determined by means of an optical effect shown by a new device which is called the black surface dew indicator. In this way, the determinations are made easily, rapidly and reliably.

The disadvantage of actually determining the dewpoints of the different air-fuel mixtures may be avoided by the use of a graph showing the relation between the dewpoint of the gasoline alone at 760 mm. pressure and the dewpoints of the different air-gasoline mixtures.

This equilibrium endpoint or dewpoint of gasoline alone is particularly easy to determine with the black surface dew indicator and its relation to the dewpoints of the air-gasoline mixtures is sufficiently definite for their derivation by means of a graph with practical accuracy.

In this way, one simple determination of the dewpoint of gasoline alone suffices for the deduction of the temperatures of complete vaporization of all the practical air-gasoline mixtures.

There are other methods which have been proposed for the determination of dewpoint of gasoline. The description above is from the work of Stevenson and Babor.

Early work was done on this subject by Wilson and Barnard, who directed attention to the importance of dewpoint and described a method for determining it in Industrial and Engineering Chemistry, Vol. 13, page 906, 1921. They found the vapor pressure of the gasoline in equilibrium with the completely vaporized fuel. From an approximate average molecular weight of the gasoline they find it possible to calculate from the vapor pressure curve of this equilibrium liquid the temperature of the initial and fractional condensation of the gasoline. They concluded that the average boiling point of the equilibrium liquid was very near to the 85 per cent point as determined by distillation of the gasoline, and that by subtracting a constant from this 85 per cent point, a close approximation to the dewpoint of the gasoline could be obtained.

The Gruse method, Industrial and Engineering Chemistry, Vol. 15, page 796, 1923, provides for the determination by passing a mixture of the gasoline vapor and air on the surface of a mirror and observing the temperature at which dew is found.

DISTILLATION OF THE FAT OIL IN SEPARATION OF NATURAL GASOLINE

Does steam distillation of the fat oil improve the quality of the gasoline produced, or is it more economical or both? What are the present tendencies toward fire stills in absorption plants?—E.G.S.

Steam distillation of the fat oil does not in itself necessarily improve the quality of gasoline produced. In the day when shell stills were used, the fire still had certain advantages over the steam still in that a greater economy of fuel was possible, by reason of the direct contact without the loss of heat due to steam conversion. A number of 2-inch coils in a shell type steam still prove to be a very inefficient means of transferring heat to the body of the oil. In both types of stills live steam was used for the purpose of lowering the partial pressure and agitating the oil, thereby facilitating the evaporation of the heavy naphtha, thus cleaning the oil and leaving it in much better condition as an absorbent by giving it as nearly as possible its original vapor pressure.

The use of fire stills, however, occasionally resulted in the cracking of the absorption oil due to superheating of the bottom still plate. It is generally understood that this cracking results in the formation of considerable unsaturated hydrocarbons, which is undesirable because hydrocarbons of this series are generally considered to be less efficient in absorbing fractions, than those of the saturated or paraffin series, and cause the product to have a bad odor.

At the present time, and for the past five years, the tendency has been towards steam stills of the bubble type, before which the oil had been preheated in tubular steam preheaters, a combination which gives a very satisfactory fuel economy together with the absence of some of the manifest hazards of the fire stills. While several manufacturers have used pipe stills with direct heat and with a high rate of efficiency, it does not appear that the use of this type of still has been extensive; because, the average manufacturer has not been able to get away from the notion that the still was essentially hazardous and without sufficient advantage over the present-type highly developed steam still.

DETERMINING QUANTITY OF BENZOL IN GASOLINE-BENZOL BLENDS

What is the most satisfactory method to employ in determining the percentage of benzol in a cracked gasoline-benzol blend?—W.H.B.

Approximate determinations of the quantity of benzol in a fuel may be made by the boiling point method. This is considered to be the average of the quantity distilling between 200 and 12 degrees Fahrenheit. If the percent off at 200 degrees Fahrenheit is 34 per cent and at 212 degrees Fahrenheit 40 per cent, the percentage of benzol is estimated to be 37 per cent. The commercial grade of benzol is known as 90 per cent benzol, which means that this quantity distills below 212 degrees Fahrenheit. The true percentage of pure benzol in this product is about 70 per cent. Pure benzol has a constant boiling point between 176 and 178 degrees Fahrenheit. Methods for the boiling point tests of benzols are described in Examination of Petroleum, by Hamor and Padgett, page 218.

It is a quite common practice to state that a certain motor fuel contains some definite quantity of benzol when intending to convey an idea of the knock rating of this particular product. Of course, large quantities of benzol are used for blending with gasoline for the preparation of special motor fuels and these may be recognized by the characteristic odor of benzol. The antiknock value of a gasoline, when expressed in terms of benzol, does not mean that the product contains benzol. It was thought that certain gasolines, which were bad knockers, could uniformly be corrected by the addition of a fixed quantity of benzol to bring the blend to a maximum power, or highest useful compression ratio in terms of the engine. This does not appear to be true; however, at the present time, the antiknock gasolines are rated on the basis of benzol equivalent. There may be other substances present that are acting to stop or reduce the detonating tendency, but when the fuel is tested in an antiknock engine, or by some other means, the results are expressed in terms of percentage of benzol.

PREPARATION AND PROPERTIES OF ICHTHYOL

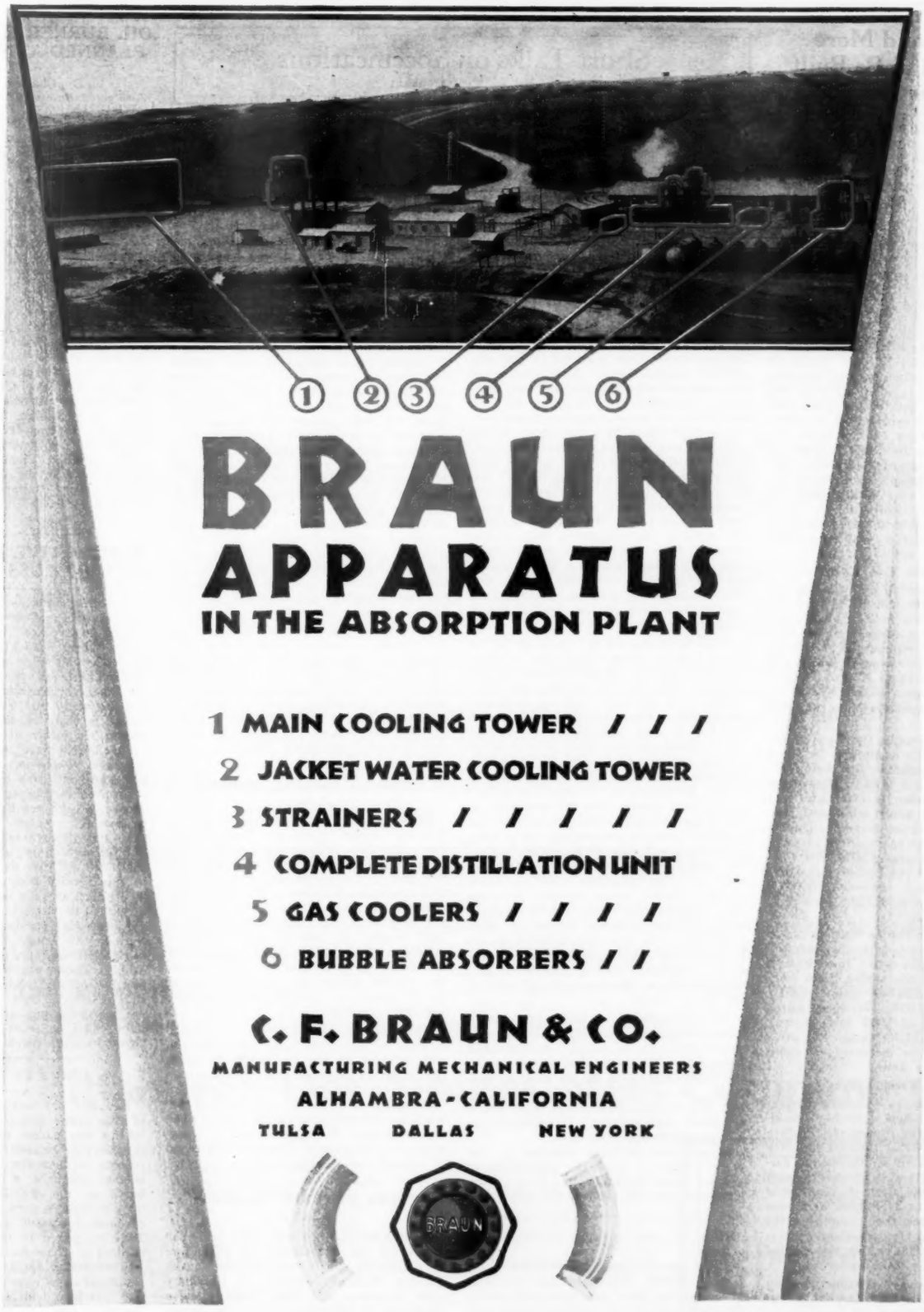
It is reported that an oil found in south Texas contains 45 per cent ichthyol. Will you kindly enlighten me as to what this substance is, chemical and physical properties, commercial uses and value. Does the oil from the above-mentioned locality contain ichthyol?—N.A.M.

We have no knowledge of ichthyol being found free in any kind of a deposit or present in a crude oil to the extent of 45 per cent. Occasionally a very heavy oil is discovered which is reported to possess either unusual lubricating value or to contain large quantities of ichthyol. Such reports are seldom supported by facts.

There is a preparation frequently sold under the name ammonium sulphoichthyolate, which is a substance of uncertain chemical structure obtained by dry distillation of certain bituminous shales found in Seefeld, Austria. These shales are rich in fossil fish, hence the name, ichthyol, from the Greek word meaning fish.

This substance is said to have some value in medicine, especially for the treatment of burns. It is a thick, black-brown liquid having a bituminous odor; it is soluble in alcohol, ether, glycerin and water. Ichthyol is priced at about $5 a pound.

The method for the preparation of ichthyol consists in treating the distillate, obtained from the shale, with concentrated sulphuric acid. The mixture is diluted with brine and any excess oil is removed by solution in naphtha. The acidified residue is then neutralized by the addition of ammonia. The product always contains some ammonium sulphate, organic acids, phenols and various complex sulphur compounds.


1 2 3 4 5 6
BRAUN
APPARATUS
IN THE ABSORPTION PLANT
1 MAIN COOLING TOWER
2 JACKET WATER COOLING TOWER
3 STRAINERS
4 COMPLETE DISTILLATION UNIT
5 GAS COOLERS
6 BUBBLE ABSORBERS
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MANUFACTURING MECHANICAL ENGINEERS
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Of Interest to Sales Departments

Ten Thousand More Airplanes to Be Built This Year Is Estimate

There will be 10,000 more airplanes in service by the end of this year according to an estimate of the Standard Statistics Co. According to this survey, manufacturers have equipped their plants so that they can greatly increase their output during the next few months.

Refiners and marketers are greatly interested in the growth of airplane industry as an important user of its products. Several companies are now making a study of the particular needs of airplanes both from the standpoint of lubrication and motor fuel.

"Nineteen hundred twenty-seven was marked by an increase in the demand for commercial airplanes," says Standard Statistics. "It is estimated that domestic production of this type of aircraft was about 300 per cent greater last year than in 1926 and that it represented considerably more than 50 per cent of total output. So sharp has been the increase in the demand for commercial airplanes that in the past half-year manufacturers, generally considered, have been unable to cope with it. Practically all the chief producers have sizable unfilled orders on their books, whereas a year ago there was a fairly large unsold surplus.

Hopeful for This Year

"Both manufacturers and dealers are confident that 1928 will be by far the most active year the industry has experienced. There is a consensus that this year's output of commercial airplanes alone will be well in excess of 10,000 and that it even may surpass 15,000. A particularly marked gain is anticipated in the demand for airplanes selling at from $2,000 to $3,000.

"There unquestionably is considerable basis for the trade's optimism. New air transportation companies are being organized almost daily, and with further considerable expansion in air routes and airports indicated, many additional concerns probably will be formed. During 1927, miles flown on schedule by air mail contractors totaled nearly 3,000,000 compared with 1,984,144 miles in 1926. Total mail carried exceeded 600,000 pounds compared with 377,206 pounds in the preceding year.

"Commercial air routes totaling 2,429 miles were inaugurated in this country during the 12 months ended June 30 last, and at the end of the period there were air operators serving 68 cities with a total mileage of 8,396. It is estimated that by the close of 1927 total airway mileage exceeded 11,000 with the prospect that it will be increased to above 15,000 miles before June.

Increasing Foreign Travel

"In addition to a domestic market which promises to show a further considerable growth during immediately future years the United States aircraft industry is being favored with an increasing foreign trade. Exports of American aircraft products during the first 10 months of 1927 were valued at $1,469,592 and were 43 per cent greater than those for the full year 1926. In October alone exports amounted to $372,636, which represented the highest monthly total on record.

"The expansion of the export market doubtless is due to the fact that the smaller nations of the world have ceased to be satisfied with the use of war material and have begun to buy modern, high-grade equipment. It has been conclusively proved in recent months that American companies can compete successfully with the manufacturers of France, England and Italy on new material, these nations having been in the past the great exporters of war surplus airplanes and motors.

"The possibilities of aviation have been so widely recognized that hundreds of companies have been organized during the past year or so to manufacture airplanes and aircraft equipment, and to operate aerial transportation lines. There are at present some 90 airplane manufacturers, or more than double the number in operation in 1926. In addition there are more than a score of engine builders, and close to 1,000 producers and distributors of accessories and spare parts."

Short Talks on Specifications

By W. T. Ziegenhain

HOW GASOLINE IS MADE

The salesman is often benefited in selling if he has a basic understanding of the way his product is made as well as being able to point out inherent differences in competitive products as a result of the difference in the manufacturing processes. Gasoline, as it is sold for general use today, is a mixture of straightrun gasoline taken direct from the crude, natural gasoline extracted from natural gas and cracked gasoline made from residue of the crude oil after the gasoline and kerosene is distilled off. Cracking may be pictured as a process similar to subjecting a rock to a high pressure. Under sufficient pressure the rock is broken into many smaller pieces, some of the rock being ground to a dust. Gas oil and fuel oil when heated to high temperatures under pressure breaks down to form gasoline, gas and coke. The cracked gasoline has certain characteristics that distinguish it from the straight run gasoline and, in general, include a lower initial, lower temperature at the 20 per cent distillation mark, a greater percentage of unsaturated hydrocarbons and a higher antiknock value.

Natural gasoline is not made at the refinery but is ordinarily shipped in from gasoline plants. These plants simply compress and cool the natural gas as it comes from the wells but, in so doing, the droplets of gasoline collect similar to the fog or mist that settles on a cold water pitcher. This mist then may be passed through a heavy oil where the droplets are dissolved in the heavy oil or it may be cooled and compressed further to the point where these fall and are collected as a liquid. The removal of the gasoline from the natural gas by passing it through a heavy oil is called absorption and accounts for the name "absorption" gasoline sometimes used in place of the general term, natural gasoline. The other process which involved higher pressures and extended cooling is called the compression system. A third system in use is the charcoal absorption process where charcoal is used to absorb the gasoline vapors in the same general way as the oil is used.

Natural gasoline made in any one of these three ways has the same general properties. It is easily distinguished from either the straight run gasoline or the cracked gasoline by its greater volatility. It usually completely distills below 375 degrees Fahrenheit, and has a relatively high gravity. It generally has a high antiknock value also.

Straightrun refinery gasoline is the more important from the standpoint of volume than the other two and at one time was the only kind of gasoline made. It is removed in its natural state from the crude oil by distillation just as pure water may be distilled from salt water, leaving the salt in the boiler. The crude oil is run to stills of various designs but the principle is the same in each. As the oil is heated, the light gasoline vaporizes and comes off through a pipe just as steam comes from a boiling tea kettle. This vapor is cooled, condensed and collected in a tank as raw gasoline. Then it is chemically treated with caustic or other chemicals to remove objectionable sulphur compounds and it is ready for the market.

But because the straight run gasoline ordinarily has a deficit of very volatile fractions, so essential for quick starting and speedy accesleration, from 10 to 30 per cent of natural gasoline is added. At those refineries where cracked gasoline is made this is ordinarily blended in also. This is common practice in a majority of the plants but in the East and in the Mid-Continent where antiknock motor fuels are being sold at a premium it is also the practice to segregate a portion of the cracked gasoline to which is added a liberal portion of natural gasoline to make a product of relatively high antiknock value. The value in turn is dependent upon the inherent properties of the two blending materials and the proportion of each blended.

In other cases antiknock motor fuels are blends of cracked, natural and even straight run gasolines and benzol in varying proportions, the benzol having relatively high and antiknock properties. Similarly, tetraethyl lead, a chemical, may be dissolved in any one or a blend of several gasolines to make a motor fuel of higher antiknock value.

ETHYL GASOLINE ABROAD

Ethyl gasoline has been placed on the English market since the first of the year by the Anglo-American Oil Co. (Standard of New Jersey) and has been followed with an extensive advertising and educational program giving the details of its use in much the same manner as done in the United States. European engines in general have been designed with a higher compression than the American cars and for that reason the foreign market has required special export gasolines, usually low endpoint and very volatile.

Through the introduction of a large number of American-made cars and the improvement of the antiknock value in the exported gasoline the tendency has been to supply higher endpoint material. Gradually, the exported gasolines are becoming representative of the grades used here and with the introduction of tetraethyl lead gasoline in England this trend is carried one step further.

UNION EXTENDS MARKETS

LOS ANGELES, Calif., Feb. 18.—The Union Oil Co. of California is extending its marketing sphere westward across the Pacific. Following closely on its entry into Australia and New Zealand as a marketer of its refined products, comes the announcement that arrangements have been completed for the distribution and sale of its Aristo motor oil in Java, the most important island of the Dutch East Indies group. For the present, according to the announcement, the Union's activities in Java will be restricted to the sale of its motor lubricant.

OIL BURNER EXHIBIT PLANNED AT WASHINGTON

By Charles E. Kern

Washington Bureau. The Oil and Gas Journal

WASHINGTON, D. C., Feb. 18.—One of the largest exhibits to be presented at the fourth annual industrial exposition which will be staged by the local Chamber of Commerce at the Washington Auditorium March 12-17, is being planned by the Oil Burner Section of the Merchants and Manufacturers' Association.

A group of oil-burner heating plants completely set up and going full blast is being arranged for this exhibit, the purpose of which will be to afford visitors an opportunity of not only viewing the plants, but also of seeing them actually in operation. It will be the first time a group of oil burners actually burning the fuel have been shown in any exhibit in the city. Permission was granted by the fire department, after investigators were satisfied of the safety of the display. A huge sign, 90 feet long and 20 feet deep, bearing the legend "Oil Burner Section," will surmount the exhibit.

Participating firms which have reserved space so far include Silent Automatic Corp., Wallace Engineering Co., Kleen-Heat Sales Co., Automatic Burner Co., and the Nokol Agency.

AUTOMOTIVE ENGINEERS DISCUSS DISTILLATES

Continued success in the development and use of the Diesel engine for use on trucks to replace the present gasoline motor promises to alter the type of fuel used for this purpose materially. The practicability of the full Diesel engine for truck service was discussed by various engineers and manufacturers at the recent meeting of the Society of Automotive Engineers at Chicago. Tests on various fuels were made and the lighter fractions of the gas oil cut or a heavy kerosene were considered best.

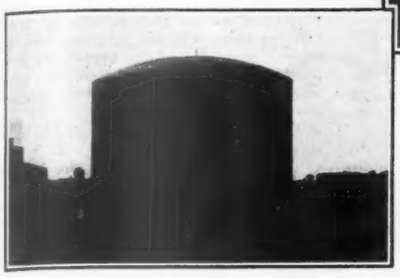
A distillate having an endpoint not to exceed 608 degrees Fahrenheit was found to give the greatest flexibility in operation and there was no deposit of soot nor objectionable odors. The heavier fuels did not give as satisfactory results in this service because of these factors. The practical tests being conducted show a marked decrease in the fuel cost in the Diesel engine compared to the gasoline engine. In comparative tests with 5-ton trucks equipped with carburetor and M.A.N. Diesel engines respectively, each hauling a 5-ton trailer, the fuel consumption of the Diesel engine truck under various operating conditions ranged from 62 to 66.5 per cent of that of the carburetor engine truck.

EXPECTS INCREASE

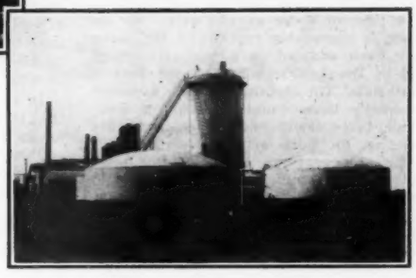
Refiners are analyzing the possibility of this year's export market as an outlet for any excess production and while considerable competition will be felt from foreign refiners for this trade, the field is fast becoming a very promising one based on the greatly increased exports of automobiles and trucks. Shipments of these increased 20.3 per cent during 1927 compared to the previous year according to the report just issued by the United States Department of Commerce.

Actual sales amounted to $406,007,984 and this is considered a very good showing since the total production of cars in the United States fell off nearly 1,000,000 cars. With 1928 promising to be the banner year in the production of cars, particularly the low priced cars, it is reasonable to expect this year's record to be even greater and the gasoline and lubricating oil consumption proportionately greater.

55,000 barrel field tank.
Angus Texas Oil Refinery—Angus, Tex.



10,000 barrel dome roof tank.
Angus Texas Oil Refinery.



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Determining Sulphur in Volatile Fuel

Accuracy, Precision and Speed Claimed for New Method Developed by Bureau of Standards. Explain Apparatus

By H. T. Kennedy[1]
Bureau of Standards, Washington, D. C.

Several methods have been developed for the determination of sulphur in fuels. These include the A.S.T.M. lamp method (D-90-26T), the A.S.T.M. bomb method (D-129-22T), and the Lomax[2] method. The first of these usually gives fair results, is reasonably rapid, and has therefore been adopted as a tentative standard by the American Society for Testing Materials. On certain samples, however, especially those containing carbon disulphide, large deviations are obtained when tests on the same material are made by different operators. The following data[4], obtained on Samples 1, 2 and 3, tested by members of the Subcommittee 7 of Committee D-2 on Sulphur Determination and Differentiation of this society, illustrate this point:

Laboratory	Sample 1	Sample 2	Sample 3
1	0.192	0.157	0.201
2	0.190	0.150	0.203
3	0.192	0.152	0.179
4	0.15	0.040	0.306
5	....	....	....
6	0.194	0.145	0.201
7	0.192	0.120	0.223

As will be observed, the general agreement on Sample 1 is excellent. On Samples 2 and 3, which are known to contain carbon disulphide, the deviations are too large when it is considered that these figures are the average of two or more determinations from each laboratory. Since the sulphur compounds that occur in motor benzene usually include carbon disulphide, the failure of Method D-90-26T to determine correctly sulphur present as carbon disulphide is a serious defect.

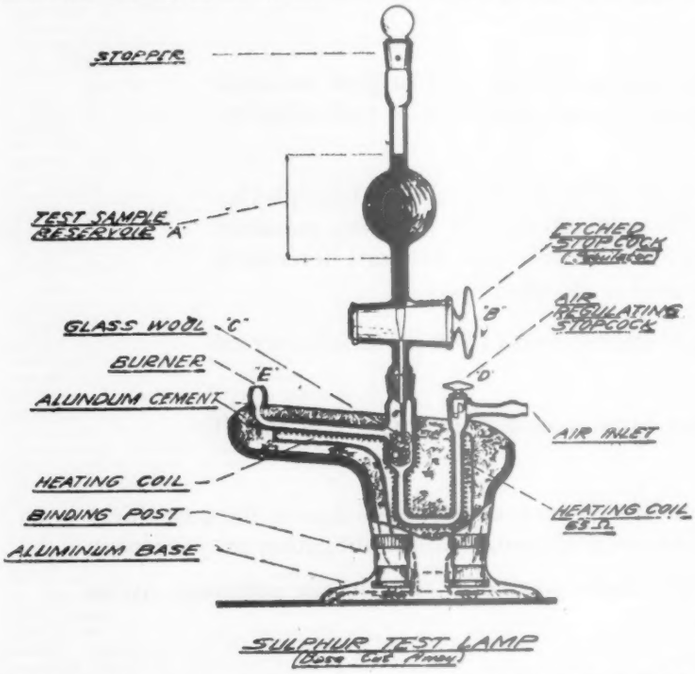
The bomb method, although probably accurate when adequate precautions are taken, has not proved so in practice when applied to motor fuels. It is also time-consuming and not suitable for routine work. However, it is one of the few methods available for products of low volatility.

The Lomax method, similar in principle to Method D-90-26T, appears to correct the tendency of the latter to give low results on carbon disulphide mixtures, but is extremely tedious. Further, as barium sulphate is precipitated from fairly concentrated (5 per cent) solutions of sodium chloride, it is not impossible that the higher results are due in part to adsorption of sodium chloride by the barium sulphate.

In the method described in this paper, the fuel is vaporized in a carbureting device and burned, and the sulphur oxides so produced are absorbed by a sodium carbonate solution of known concentration.

Apparatus

The accompanying drawing shows the essential parts of this apparatus. The fuel to be examined is contained in and measured by the reservoir A, making the weighing of the lamp before and after burning unnecessary. From the reservoir the fuel flows through the special regulator, B, which consists of an unbored stopcock, on the cylindrical surface of which is etched a tapering channel. By turning this cock, a channel of varying average width is available to conduct the fuel from the reservoir to the vaporizing chamber and, as it can be utilized through an angle of nearly 90 degrees, this device affords a delicate and convenient means of adjusting the small flow necessary to maintain a flame.



SULPHUR TEST LAMP
(Cross Cut Above)

The fuel then flows on a small plug of glass wool, C, from which it is vaporized by a current of hot air passing through the air regulator, D, and the mixture is burned at the tip, E. The air regulator D consists of a cock, the lower edge of which is ground off spirally, and whose position relative to its seat determines the length of a narrow slit which is available for the passage of air. As an angle of nearly 360 degrees can be utilized, this device also affords a convenient means of regulation.

The vaporization chamber is surrounded by a nichrome heating coil of 65 ohms resistance, designed to vaporize the fuel completely and insure that no unvaporized fuel is left on the glass wool. The proper temperature is secured when two sulphur lamps are connected in series across a 110-volt line. The vaporization chamber and heater are mounted in an aluminum casting for convenience in handling.

Procedure

To determine sulphur by means of this lamp, the heater is switched on a few minutes before the run is to be started, the reservoir is filled conveniently by means of a pipet somewhat above the upper graduation with the fuel to be tested, the fuel and air regulators are adjusted, and the flame is lighted, preferably with an alcohol flame since matches contain a large amount of sulphur. The flame is removed from under the absorber, the solution in which is then titrated as in Method D-90-26T. For more accurate work it is titrated until its color matches that in a similar absorber in which 10 cc. of standard sodium carbonate, 10 cc. of standard hydrochloric acid, and sufficient methyl orange have been mixed. One cubic centimeter of each solution is equivalent to 1 mg. of sulphur, and the same amount of methyl orange is present in each absorber.

Since the volume of sample burned is always 5 cc., the weight burned may be calculated from the specific gravity. For most unblended fuels only a small error is introduced if the figure 3.75 is assumed as the weight burned. The sulphur content may be expressed on a volume basis—i.e., as milligrams per liter, or grains per gallon—without measuring or assuming a value for the specific gravity.

As soon as the fuel has completely run out of the reservoir, another run may be started. It is unnecessary to rinse or clean the apparatus.

When working with very volatile fuels, it is sometimes advisable to decrease the heating current by connecting an auxiliary resistance in series. This is necessary, however, only in the rare case that a fuel boils in the reservoir when the full heat is maintained. It is also sometimes necessary, with such fuel or fuels containing dissolved gases, to place a few threads of glass wool in the tube leading from the fuel regulator to the vaporization chamber, so that bubbles of vapor forming there will not interfere with the smooth operation of the burner. As these threads cause no inconvenience when working with other fuels, they may be left in place permanently.

Variation of the size of flame has little, if any, effect on the results. It is convenient, however, to adjust the air and fuel regulators so that the flame is initially about one-half inch (13 mm.) high and colorless or slightly yellow at the tip of the inner cone. This flame is steady and does not overheat the glass chimney. As the fuel is burned nearly four times as fast in this method as in Method D-90-26T, it is necessary to increase the suction on the absorber to accommodate the larger amount of products of combustion.

Advantages of Method

(1) Accurate determination of sulphur, either elementary or in any form of combination which occurs in motor fuels, naphthas, and similar products.

(2) Precision. The average deviation, based on two runs on each of 50 samples containing from 0.04 to 0.17 per cent by the same operator was 0.0013 per cent of sulphur. The average deviation for different operators, based on available data of Subcommittee 7, is 0.0034 per cent of sulphur, as compared with 0.0142 per cent when the same samples were tested by the same operators using Method D-90-26T. Further data are being obtained.

(3) Rapidity. The average time consumed in making one run by the new method is 45 minutes. This is less than half the time consumed by any other method. As practically no attention need be paid to the apparatus between the times of starting and titrating, a large number of tests may be run simultaneously, or other work may be attended to while the test is proceeding.

[1] Published by permission of the National Bureau of Standards. Published in February issue of Industrial and Engineering Chemistry.
[2] J. Inst. Petroleum Tech., 10, 914 (1924).
[4] Proc. Am. Soc. Testing Materials, 25, 269 (1925).

RELATION OF FUEL CONSUMPTION TO ENGINE COMPRESSION IN CARS

By Dr. G. G. Brown*
Professor of Chemical Engineering, University of Michigan.

A very suggestive article by W. S. James in the January issue of the Journal of the Society of Automotive Engineers, brings out the relative advantages and disadvantages inherent in the different methods of increasing the engine displacement in motor cars.

Both of these methods of increasing car performance invariably increase the fuel consumption, because with the increased engine displacement a greater volume of explosive mixture must be fed to the motor for each revolution of the rear wheel. On the other hand an increase in the compression ratio of the motor increases the power and car performance and also increases the efficiency of the motor or the miles obtained per gallon of fuel with an increased car performance. For this reason it is clear why so much emphasis has been placed upon an increase in compression ratio by the automotive engineers.

Relative Costs

It may be of interest, however, to compare the relative increase in fuel consumption or decrease in mileage brought about by an increase in the rear axle ratio or in piston displacement sufficient to give the same increase in performance as a specified increase in the compression ratio.

Using for the basis of comparison the data reported by Mr. James, which are based upon a motor having a piston displacement of 100 cubic inches, a rear axle ratio of 3 to 1, a compression ratio of 4 to 1, and a car weight of 3,500 pounds, and which are found to agree closely so far as changes in compression ratio with similar data reported by Ricardo, we find:

1. An increase in compression ratio of 20 per cent, that is, from 4 to 4.8, brings about an increase in mileage of about 14 per cent accompanied by an increase in performance at 20 miles per hour that can be equaled without change in compression ratio only by increasing the rear axle ratio about 12 per cent with a corresponding decrease in mileage of about 9 per cent, or by increasing the piston displacement with a constant rear axle ratio by about 9 per cent which brings about a decrease in mileage of

* Part of paper presented at meeting of Toledo Division of American Chemical Society. Doctor Brown is in Charge of research work of the Natural Gasoline Association of America.

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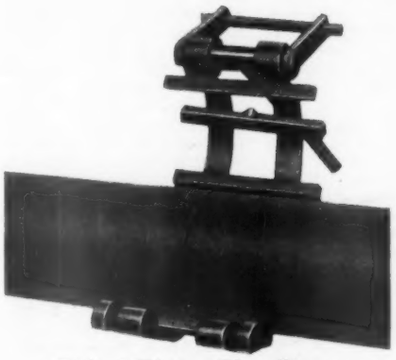

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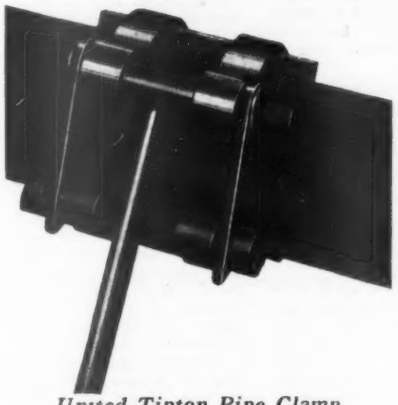

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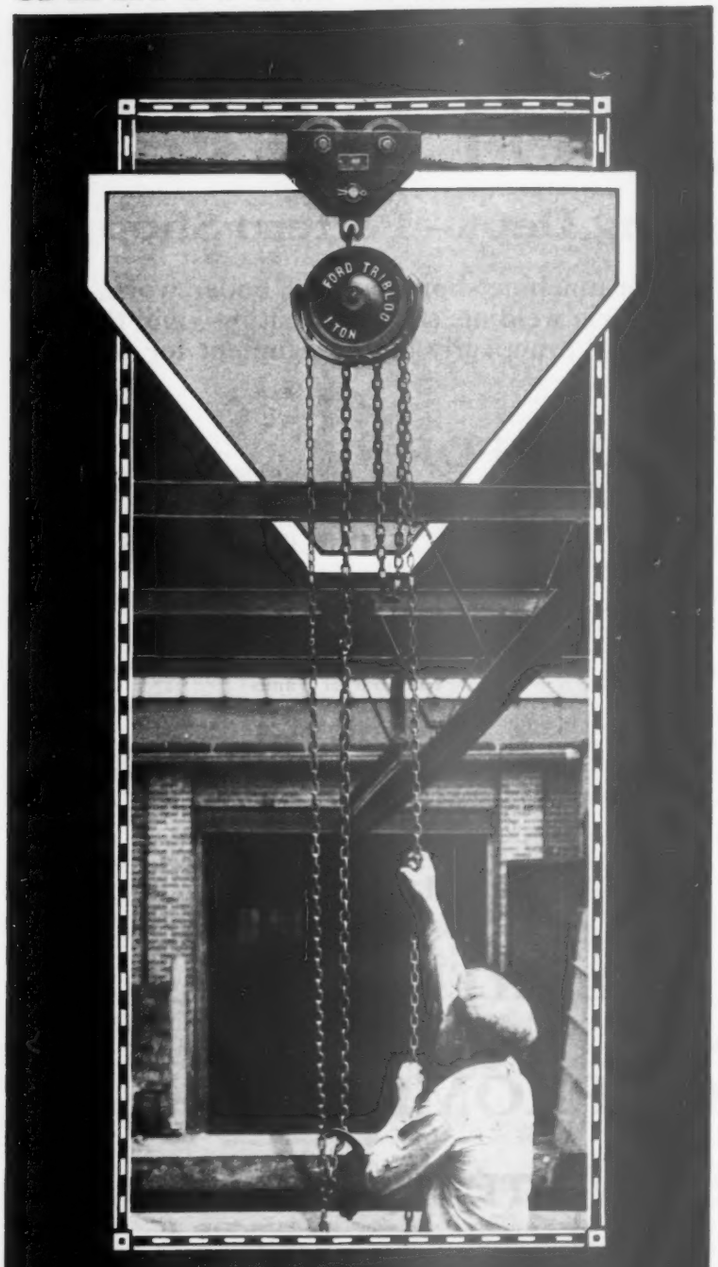

FORD TRIBLOCS are safe, fast and easy to operate.

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TRIBLOCS are available in sizes from ¼ to 40 tons, together with a complete line of roller bearing trolleys, both standard and low head room types.

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FORD CHAIN BLOCK CO. PHILA., PA.

about 4 per cent. Adding the decrease in mileage brought about by an increase in rear axle ratio, or by an increase in piston displacement to the increase in mileage brought about by the increase in compression ratio, we find that we can produce a car having the same performance as that obtained by the 20 per cent increase in compression ratio, without change in the compression ratio but with a decrease in mileage compared to that obtainable with the motor of higher compression ratio of about 23.5 per cent if the improved performance is brought about by an increase in the rear axle ratio, or a corresponding decrease in mileage of 16 per cent if the improved performance is brought about by increasing the piston displacement with a constant rear axle ratio.

2. If the compression ratio is increased 20 per cent from 5 to 6, the mileage is increased about 10 per cent, with an improvement in performance that can be obtained without change in compression ratio only by a sacrifice of about 6.75 per cent mileage if the rear axle ratio is increased, or by a sacrifice of about 4.2 per cent in mileage if the piston displacement is increased with a constant rear axle ratio. Adding these losses in mileage to the increase in mileage brought about by an increase in compression ratio from 5 to 6, we find on the same basis as used above that the mileage is decreased by about 19 per cent if the improved performance is brought about by an increase in rear axle ratio, or 13 per cent if the improved performance is brought about by an increase in piston displacement with a constant rear axle ratio.

3. If the compression is further increased from 6 to 7 to 1 we find that the mileage is increased about 7 per cent and that the improved performance can be equaled without change in compression ratio only by a corresponding decrease in mileage based on that obtainable from the 7 to 1 compression ratio motor of about 11 per cent by increasing the rear axle ratio, or about 8.5 per cent by increasing the piston displacement.

Here again the same forces apply as it is obviously much simpler and more economical for the car manufacturer to increase the compression ratio of his motor than to build a larger motor. This is particularly desirable as an increase in compression ratio further increases the mileage, while an increase in the piston displacement to obtain the same relative improvement in performance causes a decrease in the mileage.

Let us assume, however, that the improvement in performance could be brought about by an increase in piston displacement, and compare the relative fuel cost using the ordinary gasoline in a car equipped with greater piston displacement, with the use of a premium gasoline of high antiknock value in the car equipped with a motor of higher compression ratio. We shall assume a benzol value of zero for ordinary gasoline, which represents the low limit of ordinary gasoline now on the market, and a benzol value of 45 for the premium antiknock fuel. Few fuels now on the market show a benzol value of greater than 45 and the majority of the premium antiknock fuels show a benzol value of about 40 to 43, so that we are making at least a fair allowance for possible increase in compression ratio by use of premium fuel.

As a benzol value of 45 allows an increase in the compression ratio of about 20 per cent over that allowed by a fuel possessing zero benzol value, it is seen that if the motor is designed so that it can operate only on a 4 to 1 compression ratio with ordinary gasoline, we can afford to pay a 19 per cent premium for a fuel possessing an antiknock value of 45 benzol if the gasoline sold at the posted price possesses zero benzol value.

If, however, the automobile motors are designed so that they can handle the ordinary gasoline of zero benzol value at a compression ratio of 5 to 1, we can then afford to pay a premium of only 15 per cent for a motor fuel having a benzol value of 45. If the efficiency of motor design is so increased that the compression ratio of 6 to 1 can be handled by the ordinary gasoline of zero benzol value, we can afford to pay little more than 9 per cent premium for a motor fuel possessing a benzol value of approximately 45.

At the present time ordinary gasoline sold at the posted price frequently possesses a benzol value of over 20 and in some places over 30. As a benzol value of 20 indicates an increase in the highest useful compression ratio of about 5 per cent it is seen that the premium antiknock fuels possessing benzol value of about 45 do not allow an increase in the highest useful compression ratio of much over 15 per cent as compared to the average motor fuel now obtainable at the regular price.

We are now paying a 3-cent premium for antiknock fuels which corresponds to about 15 per cent based on the present selling price of ordinary U. S. Motor fuel. The above calculations suggest then that there is an economical advantage in purchasing high antiknock fuels at a premium of 3 cents, only if the motor design allows the use of a compression ratio not exceeding about 4.8 when using a fuel of zero benzol value.

As the ordinary U. S. Motor fuel now on the market exceeds zero benzol value in antiknock properties and we now have available motors of 5.5 to 1 compression ratio in quantity production which can be operated on ordinary gasoline, it seems that the industry has already reached that condition of economic balance where there is neither economic gain or loss in paying 3 cents premium, about 15 to 16 per cent of the posted price, for antiknock fuels to be used in motors having compression ratios greater than 5.5 to 1. If the price of gasoline goes up appreciably so that the 3-cent premium represents a smaller percentage in the total purchase price, or if the motors become less efficient, there may then be greater economic advantage in the use of fuels of high antiknock value in high compression motors at an increased cost of approximately 3 cents a gallon. It seems more reasonable to expect, however, that the efficiency of design of the combustion chamber of the motors will increase rather than decrease, so that it will be necessary for the selling price of gasoline to increase appreciably simply to maintain the economic balance between the increased cost of using fuels of high antiknock value in high compression motors and the decreased mileage obtained in motors of greater displacement.

As has been suggested, there is another consideration which enters in as an important factor at least from the standpoint of the automobile manufacturer. The compression ratio of a motor can be increased, with an increase in performance and mileage, without any expensive change in design or factory production equipment if the efficiency of the combustion chamber regarding knocking is appreciably increased or fuels or high antiknock value are available; while to increase the piston displacement it is necessary to retool an important and expensive part of factory production equipment.

The public must pay a premium somewhere for increased performance, either to the fuel producer for a high antiknock fuel that can be used in high compression motors or for greater fuel consumption in motors of greater displacement and to the motor car manufacturer for the expense of changing his equipment to produce motors of larger bore and greater piston displacement, unless motors of improved design are available which can be operated at higher compression ratios on ordinary gasolines.

Concerning the relative advisability of depending upon high antiknock fuels or more efficient motors, a paper presented before the Institution of Automobile Engineers in March, 1927, by H. R. Ricardo is of interest in indicating the possibilities in the latter method. Ricardo seems to be firmly convinced that it is not economic to pay a premium for high antiknock fuels, but that the solution of the problem rests entirely with the automobile manufacturer in the design and use

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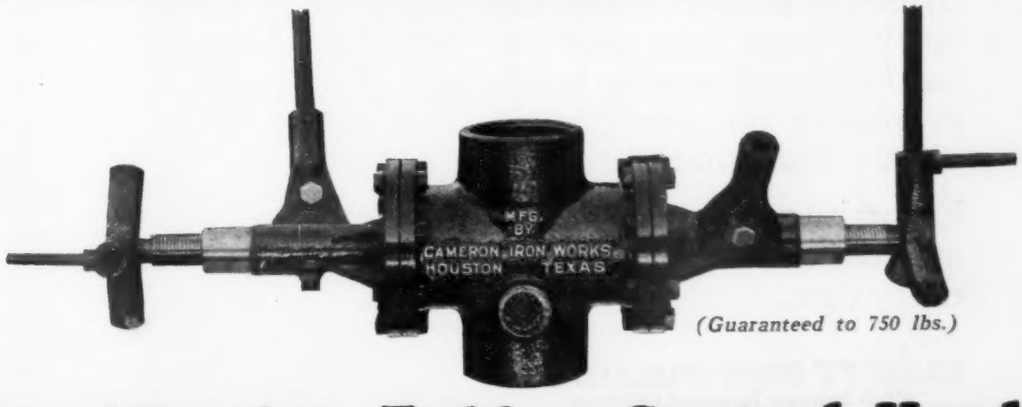

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—offers the industry a single tool that can be used in the hook-up of wells REGARDLESS of the method of recovery. It is made with every possible safety and convenience feature—and fits on top of the final string of casing. Rams are quickly opened and closed by lever jacks—and securely pack off tubing, after closing around it, by means of easily operated pressure screws.

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PUMPING WELLS do not require spider and slips with this tool. Tubing coupling rests on the machined shoulder at top of rams with stuffing box assembly screwed in this coupling. Tubing firmly held in place and *packed* by the rams closed around it.

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of the combustion chambers of greater efficiency which will allow the use of ordinary fuels at higher compression ratios.

"We can suppress detonation by:

"1. The use of metallic dopes in small quantities, such as lead ethide, or iron carbonyl, etc.

"2. The use in considerable quantities of fuel of high ignition point, such as benzol and other aromatics, naphthenes, alcohol, etc.

"3. The design of the combustion chamber.

"The first expedient may, in the author's opinion, be ruled out altogether except for purely 'stunt' purposes. All the organic metallic dopes are expensive, poisonous and more or less deleterious to the engine, and the increase in efficiency resulting from their use is more than offset by the cost, danger and trouble which they involve.

"The second expedient is now common practice; all the oil companies now so blend their fuels as to maintain a uniform and fairly high proportion of aromatics and naphthenes at all events on the European market. Differences, of course, still exist, depending upon the sources of supply available to the different oil companies, but they are nothing like so great as formerly, and compared with seven years ago, a designer may now rely safely on using a compression at least half a ratio higher, thanks to the improvement in the fuel alone.

"In the author's experience, the widest scope of all lies in the direction of the third expedient, thanks to the greatly increased knowledge of the process of combustion and the application of this knowledge to the design of the combustion chamber.

"As illustrating the wide differences between different shapes of combustion chamber on the same engine under identical conditions, we have found that, referred to our variable compression engine, the highest useful compression ratios of the various heads tested has ranged from 4.8 to 1 to as high as 6.5 to 1 an extraordinarily wide variation, all the more so considering that none of the heads tested were designed to have a low detonation value. It would have been easy enough to fit a head which would have detonated even below 4.0 to 1, in fact some of the engines we have had set to us for test have detonated at considerably more than a whole ratio less than our variable-compression engine. It would seem, therefore, that there is far more to be done by studying the shape of the combustion chamber than by any doping of the fuel or other known means with the added advantage that shape costs nothing and is ubiquitous."

This statement is indeed interesting from a successful automotive engineer who has already partially solved the problem of using ordinary fuels in motors of increased compression ratios.

Considering the various factors that have been mentioned, indications are that the motor fuel of tomorrow will be sold largely upon its merits as a motor fuel, that is, upon its performability on an ordinary or typical motor car. High gravity, color, doctor sweet, low endpoint, odor and similar properties bear practically no relation to the performability of the fuel and because of this will probably disappear from the specifications. In the light of our present knowledge it seems that the motor fuel giving the best possible performance on motors now in use is the one that has a high partial volatility at low temperatures as indicated by the 8 to 18 per cent range in the A.S.T.M. distillation, a high partial volatility for acceleration and smooth running as indicated by 40 to 75 per cent range on the A.S.T.M. distillation, and a reasonably high dew point to prevent loss in power and increased fuel consumption on motors which supply a large amount of heat to the manifold. Such a fuel must not possess too high a vapor pressure or tendency to cause vapor. This is necessary to prevent trouble when the fuel is used in motors which supply a large amount of heat to the carburetor. The fuel must possess sufficient antiknock value to handle satisfactorily the cars in general use whatever their compression ratio may be. It seems, however, that there will not be an increase in demand for higher antiknock values because the gain obtained in increasing the compression ratio beyond about 6 to 1 becomes relatively less and less, and the difficulty of producing an extremely high antiknock fuel becomes increasingly greater as the antiknock value exceeds 45 or 50 benzol. It seems more reasonable to expect that moderately high antiknock value will become a specification for high grade fuels. With the increasing efficiency of the motor design we should expect to have motors possessing compression ratios as high as 6 to 1 and still using what we may consider to be ordinary gasoline having a benzol value of 25 to 35 based on our present standards. We already have motors of 5.5 compression ratio operating on motor fuel on benzol value of considerably less than this. In fact some tests indicate that such motors can be operated on motor fuels of rather bad knocking properties, even less than what we now consider to be zero benzol value.

In general it seems to me that there must be a balance between the properties of the motor fuel and the requirements of the motor. It is impossible, of course, to strike such a balance until we know accurately the relationship between the motor fuel characteristics and motor performance. A number of laboratories are now working on this subject and we may expect within a few months or at least a few years to have accurate and widely distributed information on this point, so that we will find motor fuel sold on the basis of performability, as indicated by those characteristics which are known to indicate superior motor performance. If the available fuel is deficient in partial or effective volatility, this shortcoming may be remedied by blending the proper amount of natural gasoline; if lacking in antiknock value after such blending it may be doped with ethyl fluid. Means are available to give any fuel the desired properties if such properties are not inherent in the fuel.

A PECULIAR MONOPOLY

Trader—"I note that one witness at the Federal oil inquiry charges a monopoly exists in California, with eight companies controlling the situation."

Oil Shareholder—"If that is the case shareholders should insist on the monopoly putting up prices so we can get a reasonable return on our investment. Who ever heard of a monopoly fixing prices at levels that forced the corporations represented to show deficits?" — Wall Street Journal.

Domestic Exports of Petroleum and Refined Products

		December		12 Mos. Ended Dec.	
		1926	1927	1926	1927
Crude petroleum	Bbls.	1,282,976	1,717,307	15,406,045	15,843,405
	$	2,289,143	2,956,798	28,496,773	25,944,489
Total refined petroleum	Bbls.	9,425,223	8,450,881	108,397,776	115,561,610
	$	41,428,383	29,937,008	497,211,908	429,900,884
Gasoline, naphtha and other light prod.	Bbls.	3,367,693	3,026,732	42,479,876	43,436,328
	$	20,116,245	13,484,352	263,199,938	210,369,635
Illuminating oil	Bbls.	1,835,487	1,226,324	22,016,215	19,279,503
	$	8,066,329	5,211,479	100,362,877	78,873,861
Gas and fuel oil	Bbls.	3,307,742	3,402,632	34,516,390	43,018,580
	$	4,535,680	3,798,897	46,354,106	49,943,814
Lubricating oil	Bbls.	903,244	786,161	9,256,359	9,622,894
	$	8,554,848	7,309,985	86,414,821	88,826,885
Other refined petroleum	Bbls.	10,957	9,032	128,936	143,777
	$	156,281	132,295	1,890,364	1,886,719
Paraffin wax	Lbs.	28,409,665	30,568,767	335,583,747	340,297,994
	$	1,612,281	1,723,447	18,934,245	16,029,503

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NEW LOCATIONS IN TEXAS PANHANDLE AND NORTH AND WEST TEXAS FIELDS

TEXAS PANHANDLE FIRST REPORTS

Carson County

Amarillo Oil Co.'s No. 1 E. S. Polling, 660 feet south and west of the NE cor. of the north 80 acres of the NE of Section 12, Block Y-2, B. & B. Survey. Empire Gas & Fuel Co.'s No. 1 White Deer Investment Co., C of SE of Section 51, Block 4, I. & G. N. Survey.

Gray County

Eslick and others' No. 1 J. A. Hopkins, 330 feet south and west of the NE cor. of the west 80 acres of the SW of Section 84, Block B-2, H & G. N. Survey. Gibson Oil Corp.'s No. 9 J. B. Bowers, 330 feet south and west of the NE cor. of Section 92, Block B-2, H. & G. N. Survey. The Texas Company's No. 1 J. E. Williams, 230 feet south and 1,120 feet east of the NW cor. of the NW of Section 7, Block 1, A. C. H. & B. Survey.

Wheeler County

H Vaughan and others' No. 1 C. C. George, C of SE of NW of Section 96, Block 17, H. & G. N. Survey.

NORTH CENTRAL AND WEST TEXAS FIRST REPORTS

Archer County

Fain-McGaha Oil Corp.'s No. 1 L. F. Wilson, 150 feet north and west of the SE cor. of the north 20 acres of Lot 27, Wilsons Geraldine Subdivision. D. O. Johnson and others' No. 1 L. F. Wilson, 150 feet south and west of the NE cor. o Lot 26, Wilsons Geraldine Subdivision. H. M. Kellsher and others' No 1 W. L. Andrews, 150 feet north and west of the SE cor. of Section 182, Thomas Glass Survey, A-141. United Producers Co.'s No. 3 J. J. Perkins and others, 150 feet north and west of the SE cor. of the SW cor. of Section 15, League 3, Denton County School Land, A-117. P. F. Gwynn and Humble Oil & Refining Co.'s No. 1 J. E. Birdwell, 150 feet north and 450 feet west of the SE cor. of the north 75 acres of the west 160 acres of Section 2,418, T E. & L. Survey.

Panhandle Refining Co. and Grisham's No. 1 W. R. Farmer-B, 150 feet south and 1,037 feet west of the SE cor. of Section 1, J. Poitevent Survey, A-347, and located in the G. P. Meade Survey, A-1,244. Same company's No. 1 W. R. Farmer-C, 862 feet north and 341 feet west of the SE cor. of Section 1, J. Poitevent Survey, A-347. Sun Oil Co.'s No. 17 W. R Farmer, 1,050 feet north and 750 feet west of the SW cor. of the Charles C. Brown Survey, A-20, and located in the Bell County School Lands, A-12. The Texas Company's No. 1 S. M. Cowan-G, 978 feet north and 3,946 feet east of the SW cor. of Section 87, and located in Section 88, Jefferson County School Land, A-240.

Brown County

Amerada Petroleum Corp.'s No. 5 Jim Gilbreath, 600 feet north and 400 feet west of the SE cor. of their 30-acre lease out of the R. F. DeBord Survey, A-2,136. Cranfill & Reynolds' No. 1 W. E. Hill, 1,631 feet north and 1,050 feet east of the SW cor of the M. Mudgett Survey No. 63, A-648. Same company's No. 2 J. W. Newton, 4,550 feet north and 3,100 feet west of the SE cor. of the R. Honeycutt Survey No. 623, being 980 feet north and 1,320 feet west of the SE cor. of Lot No. 14. Cen-Tex Refining Co.'s No. 2 H. L. Allcorn, 3,950 feet south and 2,600 feet west of the NE cor. of the R. Honeycutt Survey No 623, being 200 feet north of the south line and 550 feet east of the west line of their lease. Same company's No. 1 M. W. Bull, 4,100 feet south and 3,350 feet west of the NE cor. of the R. Honeycutt Survey No. 623, being 200 feet north of the south line and 188 feet west of the east line of their lease.

Duffield and Howard Petroleum Co.'s No. 1 Samuel Cox, 210 feet north and 300 feet east of the SW cor. of the Samuel Cox 366.4-acre tract out of the M. Duncan Survey No. 55, A-242. Humble Oil & Refining Co.'s No. 4 J. H. Allen-A, 200 feet south and 600 feet west of the NE cor. of Lot 7, Juan Delgado Survey, No. 785. Same company's No. 1 J. H. Allen-C, 150 feet north and west of the SE cor. of the north 35 acres of Lot 6, Juan Delgado Survey, No. 785. Pandem Oil Corp.'s No. 3 A. D. Hutton-A, 150 feet north and west of the SE cor. of the north 80 acres of the J. A. Nobles Survey, A-1,947. Same company's No 4 A. L. Curry-B, 150 feet north and 450 feet east of the SW cor. of the south 20 acres of the north 40 acres of the west 80 acres of the E. L. Betts Survey, A-70. E. H. Ramsey's No. 4 E. D. Henson, 455 feet north and 158 feet east of the SW cor. of his lease out of the G. Logan Survey, No. 147, A-600.

Scrivenor and others' No. 1 T. M. Windham 870 feet north and 1,170 feet west of the SE cor. of the Martin Byrd Survey No. 140. Shuler & Davies' No. 1 B. S. Boysen, 150 feet south and 807 feet east of the NW cor. of the south 40 acres of the north 80 acres of the H. Presler Survey, A-2,041. Syndicate Oil Co.'s No. 2 A. L. Curry, 150 feet south and 450 feet east of the NW cor. of the south 40 acres of the west 80 acres of the E. L. Betts Survey, A-70. Same company's No. 1 A. D. Dutton, 150 feet south and west of the NE cor of the south 80 acres of the J. A. Nobles Survey, A-1,947. S. S. Aldridge's No. 2 J. D. Woods, 150 feet northwest of the southeast line and 150 feet northeast of the southwest line of the D. P. Gentry Survey, A-1,731. H. P. Evans' No. 1 Emma Galyan, 600 feet north and 510 feet east of the SW cor. of the SE of the NW of Section 10, H. T. & B Survey. Van Bibber & Lehman's No. 5 A. C. Evans, 450 feet north and 1,426 feet east of the SW cor. of the A. C. Evans 106.5-acre tract out of the James Woodward Survey, No. 20, A-964.

Borden County

Marland Oil Co.'s No. 1 A. O. Murphy, C of SW of Section 66, Block 25, H. & T. C. Survey.

Callahan County

H. M. Pardee's No. 1 I. N. Jackson, 150 feet south and west of the NE cor. of the SE of the SW of Section 115, B. B. B. & C. Survey.

Coleman County

Atkinson-Dean and The Texas Company's No. 1 W. O. Starnes, 150 feet north and west of the SE cor. of the W. O. Starnes 199-acre tract out of Section 2, Block 1, G H. & H. Survey. Roxana Petroleum Corp.'s No. 1 G. M. Gray, 660 feet south and west of the NE cor. of the D. D. Young Survey, No. 179.

Crockett County

Osage Oil Corp.'s No. 3 H. M. Halff, 860 feet south and 2,150 feet east of the SE cor. of Section 61, Block 1, I. & G. N. Survey, Pecos County, and located in Section 70, Block 1, I. & G. N. Survey, Crockett County.

Eastland County

Applegate and others' No. 1 C. C. Barker, 660 feet north and 1,050 feet east of the SW cor. of Section 126, H. T. & B. Charter Oil Co.'s No. 1 E. Roper, 200 feet south and 600 feet east of the south 61 acres of the E. Roper 139-acre tract out of the B. B. B. & C. Survey. J. W. Hooser's No. 9 W. U. Fox, 1,355 feet north and 450 feet east of the SW cor. of his 45.2-acre lease out of Section 67, McLennan County School Land, League 3 and 4. J. W. Hooser's No. 10 W. U. Fox, 755 feet north and 450 feet east of the southwest corner of his 45.2-acre lease out of Section 67, League 3 and 4, McLennan County School Land. Texas Pacific Coal & Oil Co.'s No. 2 fee, 1,433 feet south and 300 feet west of the northeast corner of their 132-acre tract out of the W. Van Norman Survey. J. W. Hooser and others' No. 1 J. H. Henry, 150 feet north and 150 feet east of the southwest corner of the northeast of the H. P. Genoway Survey. J. W. Hooser and others' No. 2 J. H. Henry, 150 feet south and west of the northeast corner of the H. P. Genoway Survey. Schimmel Production Corp.'s No. 1 W. H. Tolle

and others, 650 feet north and 1,200 feet east of the SW cor. of Section 458, S. P. R. R. Survey.

Garza County

Marland Oil Co.'s No. 1 B. F. Pippin, C NW Section 1,210, T. T. R. R., A-749.

Glasscock County

Meriwether Oil Co.'s No. 1 L. S. McDowell, 750 feet south and east of the NW cor. of SW of Section 34, Block 34, Township 2s, T. P. R. R.

Howard County

Green Oil & Refining Co.'s No. 1 H. R. Clay, 250 feet north and west of the SE cor. of Section 127, Block 29, W. & N. W. R. R. Tate-Weekley & Tubbs' No. 3 Dora Roberts, 2,490 feet south and 1,170 feet west of the NE cor. of Section 156, Block 29, W. & N. W. R. R.

Irion County

P. E. Hill's No. 1 Horney, 150 feet south and 450 feet west of the NE cor. of Section 2, Block 3, H. & T. C.

Jack County

J. G. Burkett and others' No. 1 G. B. Wade, 1,475 feet north and 1,450 feet west of the SE cor. of George Brown Survey, A-1,033. H. A. Ellis & Atlantic Oil Producing Co.'s No. 1 Mrs. Kate Hoefle, 150 feet south and east of the northwest corner of the southeast of the S. F. I. W. Survey, A-559. Panhandle Refining Co.'s No. 1 J. M. Daugherty, 150 feet north and 1,050 feet east of the southwest corner of the J. M. Daugherty 150-acre tract out of Isaac Hughson Survey, A-256.

Montague County

R. I. Carter & Rycade Oil Co.'s No 5 R. W. Cunningham and others, 450 feet south and 150 feet east of the northwest corner of their 40-acre lease and located in the J. N. Hodges Survey, A-1,160. Pure Oil Co.'s No. 3 L. Keck-A, 2,100 feet south and 150 feet east of the northwest corner of the L. Keck 225-acre tract out of the William Doncho Survey, A-178. Same company's No. 4 S. F. Loy and others, 3,360 feet north of the south line and 150 feet east of the west line of their 80-acre lease out of the William Donohoe Survey, A-178.

Palo Pinto County

Texas Pacific Coal & Oil Co.'s No. 156 J. N. Stuart, 1,800 feet south and 2,100 feet west of the NE cor. of Section 74, Block 4, T. P. R. R. Survey.

Pecos County

Skelly Oil Co.'s No. 1 J. H. Tippett, 1,217 feet north and 1,330 feet west of the southwest corner of the Runnels County School Land, A-2,169, and located in Section 108, Block 194, G. C. & S. F. Transcontinental Oil Co.'s No. 1 University Land, 1,980 feet north and east of the SW cor. Section 18, Block 18, University Land.

Runnels County

Jones Oil Syndicate's No 1 W. Hale, 1,600.8 feet south and 2,330.5 feet east of the NW cor. of Section 109, E. T. R. R., being 212 feet south and 150 feet west of the NE cor. of Lot 29. Marland Oil Co.'s No. 1 R. R. Russell, south 60 degrees east 3,470 feet and north 30 degrees east 330 feet of the southwest corner of the R. R. Russell tract out of the J. F. G. Roach Survey Marland Oil Co. & Smith Oil Co.'s No. 1 A. C. Herring, C of Section 121, E. T. R. R.

Shackelford County

Albany Oil Co.'s No. 7 W. D. Reynolds, 1,670 feet south and 820 feet east of the NW cor. of the NE of Section 24, Block 11, T. & P. R. R. O. P. Deener's No. 1 B. C. Harvey, 200 feet south and east of the NW cor. of Section 6, Block 14, T. & P. R. R. A. J. Hughes and others' No. 1 C Dillingham, 150 feet southwest of the northeast line and 150 feet southeast of the northwest line of the southwest 80 acres of the southeast 160 acres of Section 552, T. E. & L. Roeser & Pendleton's No. 40 W. I. Cook-A, Section 84, 150 feet south and east of the NW cor. of the SE of the NE of Section 84, Block 10, E. T. R. R.

Stephens County

Texas-Louisiana Power Co.'s No. 2 J. B. Morton, 600 feet north and 200 feet east of the southwest corner of the south 120 acres of the E half of Section 123, H. T. & B

Throckmorton County

Reiter-Foster Oil Corp.'s No. 3 M. K. Graham-A, 150 feet south and east of the NW cor. of NE of Section 992, T. E. & L.

Tom Green County

Lone Eagle Oil Co.'s No. 1 Sharp, 5,280 feet north and 1,320 feet west of the southeast corner of the W. Elzel Survey No. 167.

Wichita County

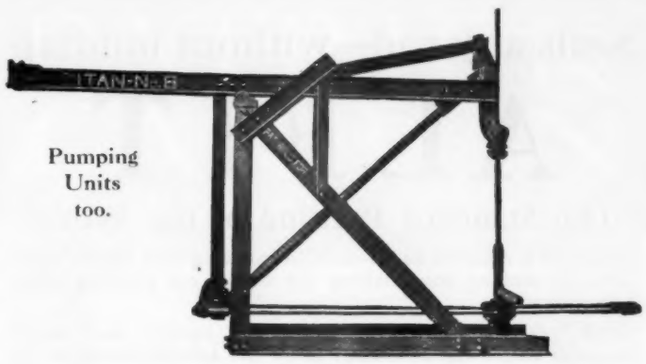
Grayce Oil Co.'s No. 5 O. & F. Schmisseur, 840 feet north and 625 feet east of the SW cor. of Block 73, Red River Valley Lands. T. Lomax and others' No. 1 W. H. Chilson, 150 feet south and west of the NE cor. of Section 4, M. Ramsey Survey, A-471. E. J. Stump & Co.'s No. 1 W. H. Chilson-A, 150 feet north and 750 feet east of the SW cor of the SE of Section 4, League 4, Denton County School Land, A-417. Atlantic Oil Producing Co. and others' No. 2 H. W. Barton, 3,491 feet north and 750 feet east of the SW cor. of the W. H. Spillers Survey, A-258. C. H. Clark and others' No. 5 W. T. Waggoner, 790 feet south and 800 feet west of the NE cor. of Section 33, Block 5, A-108. Coleman & Coppock's No. 1 Kemp & Kempner, 1,376 feet south and 1,110 feet west of the NE cor. of Block 82, Kemp Wichita Valley Land. Same company's No. 2 Kemp & Kempner, 1,376 feet south and 810 feet west of NE cor. of Block 82, Kemp Wichita Valley Land. Same company's No. 3 Kemp & Kempner, 1,076 feet south and 810 feet west of the northeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 4 Kemp & Kempner, 1,076 feet south and 1,110 feet west of the northeast corner of Block 82, Kemp Wichita Valley Land. Coleman & Coppock's No. 3 Kemp & Kempner, Lot 4, 718 feet north and 750 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 4 Kemp & Kempner, Lot 4, 718 feet north and 1,050 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 5 Kemp & Kempner, Lot 4, 718 feet north and 1,350 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 6 Kemp & Kempner, Lot 4, 718 feet north and 1,650 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 3 Kemp & Kempner, Lot 5, 506 feet north and 900 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Coleman & Coppock's No 4 Kemp & Kempner, Lot 5, 506 feet north and 1,200 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 5 Kemp & Kempner, Lot 5, 506 feet north and 1,500 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. J. E. Dunaway and others' No. 1 F. P. Yarbrough, 1,009 feet south and 1,078 feet west of the NE cor. of Section 29, Block 5, H. & T. C. Survey, A-104. Humble Oil & Refining Co.'s No. 1 N. C. Griffin, 1,579 3 feet south and 596.2 feet west of the most northerly northeast corner of the N. C. Griffin tract out of the heirs of Floyd Jordan Survey, A-167. C. H. Lebow's No. 12 J. Schultz, 2,050 feet south and 1,850 feet west of the NE cor. of Section 4, H. T. & B. Survey, A-474. Shappell Oil Co.'s No. 13 Kemp & Kempner-A, 23 acres, 550 feet south and 150 feet east of the NW cor. of Section 18, Kemp Wichita Valley Land.

Wilbarger County

Consolidated Oil Co.'s No. 1 D. Wheeler, 150 feet south and west of the NE cor. of the SW of Section 56, Block 4, H. & T. C. Golding-Cochran and others' No. 1 W. T. Waggoner-D, 220 feet south and 205 feet east of the NW cor. of the SW of the SE of Section 24, Block 4, H. & T. C. Jeffers & Jeffers' No. 1 W. T. Waggoner, 150 feet south and west of the NE cor. of Section 57, Block 4, H. & T. C. Phillips Petroleum Co.'s No. 18 W. T. Waggoner-D, 170 feet north and 220 feet west of the SE cor. of the NE of the NE of Section 43, Block 4, H. & T. C. Same company's No 23 W. T. Waggoner-QQ, 489 feet north and 1,398 feet east of the southwest corner of their "QQ" lease out of Section 47, Block 4, H. & T. C.

Winkler County

Atlantic Oil Producing Co.'s No. 5



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Grisham-Hunter, 1,650 feet north and east of the SW cor. of Section 34, Block B-5, School Land. Same company's No. 6 Grisham-Hunter, 990 feet north and 1,650 feet east of the SW cor. of Section 34, Block B-5, School Land. Same company's No. 2 Grisham-Hunter-E, 330 feet south and 2,310 feet west of the NE cor. of Section 41, Block B-5, School Land. Same company's No. 3 Grisham-Hunter-E, 330 feet south and 990 feet west of the NE cor. of Section 41, Block B-5, School Land. Same company's No. 4 Grisham-Hunter-E, 990 feet south and 330 feet west of the NE cor. of Section 41, Block B-5, School Land. Atlantic Oil Producing Co. & Collett's No. 3 T. G. Hendricks-F, 330 feet south and 1,650 feet east of the NW cor. of Section 40, Block 26, School Land. Cranfill & Reynold's No. 2 T. G. Hendricks-C, 330 feet north and 1,650 feet east of the SW cor. of Section 33, Block 26, School Land. Humble Oil & Refining Co.'s No. 9 Grisham-Hunter, 330 feet south and west of the NE cor. of Section 34, Block B-5, School Land. Same company's No. 10 Grisham-Hunter, 1,650 feet south and 990 feet east of the NW cor. of Section 41, Block B-5, School Land. Same company's No. 4 Ida Hendricks-B, 1,650 feet north and 330 feet west of the SE cor. of Section 29, Block B-5, School Land. Humble Oil & Refining Co.'s No. 1 T. G. Hendricks-C, 330 feet north and west of the SE cor. of Section 32, Block 26, School Land. Same company's No. 1 J. B. Walton-A, 2,310 feet north and 330 feet east of the SW cor. of Section 48, Block 26, School Land. Same company's No. 1 J. B. Walton-B, 2,310 feet south and 330 feet west of the NE cor. of Section 47, Block 26, School Land. Independent Oil & Gas Co.'s No. 5 Grisham-Hunter-B, 330 feet south and 2,310 feet east of the NW cor. of Section 41, Block B-5, School Land. Marland Oil Co.'s No. 1 T. G. Hendricks, 330 feet north and west of the SE cor. of the W half of Section 33, Block 26, School Land. Same company's No. 2 T. G. Hendricks, 990 feet north and 2,310 feet east of the SW cor. of Section 33, Block 26, School Land. Same company's No. 3 T. G. Hendricks, 990 feet north and west of the SE cor. of the W half of Section 33, Block 26, School Land. Republic Production Co.'s No. 3 Grisham-Hunter-B, 2,310 feet north and 330 feet west of the SE cor. of Section 41, Block B-5, School Land. Southern Crude Oil Purchasing Co.'s No. 2 T. G. Hendricks, T-67-3-B, 990 feet north and east of the SW cor. of Section 33, Block 26, School Land.

Young County

Alexander and others' No. 1 C. W. Johnson, 150 feet south and east of the northwest corner of Lot No. 15, Richardson Brothers Subdivision, E. W. Sergeant Survey, A-253. Allday Oil Corp.'s No. 1 C. W. Johnson, 150 feet north and east of the southwest corner of Lot No. 14, Richardson Brothers Subdivision, E. W. Sergeant Survey, A-253. C. Kleiner and others' No. 2 C. W. Langston, 450 feet south and 150 feet west of the northeast corner of the south 125 acres of Section 1,490, T. E. & L. Pennell and others' No. 1 C. W. Johnson, 150 feet south and east of the northwest corner of Lot No. 16, Richardson Brothers Subdivision, E. W. Sergeant Survey, A-253. Rannell Oil Co.'s No. 5 J. W. Jack-A, 450 feet north and 150 feet west of the SE cor. of the NW of Section 23, Young County School Land, A-1,284. Robert Oil Corp.'s No. 1 J. K. Thomas, 450 feet north and west of the SE cor. of Section 155, T. E. & L. Paull Oil Co's No. 2 W. J. Mathis, 794.6 feet north and 200 feet east of the most westerly southwest corner of the J. W. Terry Survey, A-1,544.

Corrected Locations

In Brown County—McCulloch and others' No. 1 J. W. Newton, 3,200 feet north and 150 feet east of the most westerly southwest corner of the J. W. Newton tract out of the R. Honeycutt Survey No. 623. Mitcham & Taylor's No. 1 J. W. Newton, 2,000 feet north and 4,550 feet east of the southwest corner of the R. Honeycutt Survey No. 623. Neiswanger and others' No 1 B. S. Boysen, 64 feet north and 807 feet east of the southwest corner of the north 40 acres of the B. S. Boysen 160-acre tract out of the H. Press-

RECEIPTS OF CALIFORNIA OILS AND IMPORTS OF PETROLEUM

Receipts of California crude and refined oils at Atlantic and Gulf Coast ports for the month of January totaled 2,065,000 bbls., a daily average of 66,613 bbls., compared with 2,452,000 bbls., a daily average of 79,097 bbls. for the month of December.

Receipts at Atlantic and Gulf Coast ports for the week ended February 4 totaled 110,000 bbls., a daily average of 15,714 bbls., against 385,000 bbls., a daily average of 55,000 bbls. for the week ended January 28, 1928.

	Total month January	Total month December	Week ended Feb. 4	Week ended Jan. 28
At Atlantic Coast ports:				
Baltimore	477,000	333,000	110,000	75,000
Boston	94,000	94,000	.....	.....
New York	962,000	938,000	.....	90,000
Philadelphia	231,000	756,000	.....	156,000
Others	301,000	219,000	.....	64,000
Total	2,065,000	2,340,000	110,000	385,000
Daily average	66,613	75,484	15,714	55,000
At Gulf Coast ports	.....	112,000	.....	.....
Daily average	.....	3,613	.....	.....
Total Atlantic and Gulf Coast ports	2,065,000	2,452,000	110,000	385,000
Daily average	66,213	79,097	15,714	55,000
Distribution of total California receipts is as follows:				
Crude	649,000	701,000	.....	90,000
Gasoline	881,000	1,055,000	110,000	231,000
Kerosene	159,000	165,000	.....	.....
Gas oil	308,000	148,000	.....	64,000
Fuel oils	68,000	326,000	.....	.....
Lubricants	.....	57,000	.....	.....
Total	2,065,000	2,452,000	110,000	385,000

According to figures collected by the American Petroleum Institute, imports of crude and refined oils at the principal ports for the month of January totaled 7,245,000 bbls., a daily average of 233,710 bbls., compared with 5,995,000 bbls., a daily average of 193,387 bbls. for the month of December.

Imports at principal United States ports for the week ended February 4 totaled 1,761,000 bbls., a daily average of 251,571 bbls., compared with 1,656,000 bbls., a daily average of 236,571 bbls. for the week ended January 28.

	Total month January	Total month December	Week ended Feb. 4	Week ended Jan. 28
At Atlantic Coast ports:				
Baltimore	472,000	1,336,000	54,000	65,000
Boston	134,000	74,000	76,000	.....
New York	3,337,000	2,448,000	928,000	663,000
Philadelphia	864,000	592,000	268,000	172,000
Others	1,233,000	925,000	230,000	388,000
Total	6,040,000	5,375,000	1,556,000	1,288,000
Daily average	194,839	173,387	222,286	184,000
At Gulf Coast ports:				
Galveston district	155,000	80,000	65,000	65,000
New Orleans and Baton Rouge	1,008,000	476,000	140,000	203,000
Port Arthur and Sabine district	.....	26,000	.....	.....
Tampa	42,000	38,000	.....	.....
Total	1,205,000	620,000	205,000	268,000
Daily average	38,871	20,000	29,285	52,571
At all Unite States ports:				
Total	7,245,000	5,995,000	1,761,000	1,656,000
Daily average	233,710	193,387	251,571	236,571

ler Survey, A-2,041. J. W. Sorrells and others' No. 1 Mrs. F. H. Cross, 2,550 feet north and 400 feet east of the southwest corner of the James Kenny Survey No. 624.

In Coleman County—Humphrey Brothers & Dozier's No. 1 J. T. Floyd, 1,470 feet south and 225 feet west of the NE cor. of Section 23, Coleman County School Land.

In Montague County—Benson & Benson and others' No. 1 W. G. Rucktashel, 150 feet north and west of the southeast corner of the W. G. Rucktashel 215-acre tract out of the G. Payne Survey, A-15.

In Wichita County—Coleman & Coppock's No. 1 Kemp & Kempner, Lot 4, 718 feet north and 150 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 2 Kemp & Kempner, Lot No. 4, 718 feet north and 350 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 1 Kemp & Kempner, Lot 5, 506 feet north and 300 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land. Same company's No. 2 Kemp & Kempner, Lot 5, 506 feet north and 600 feet west of the southeast corner of Block 82, Kemp Wichita Valley Land.

In Wilbarger County — Atlantic Oil Producing Co. and others' No. 1 W. T. Waggoner, 450 feet north and 150 feet east of the SW cor. of SW of the SE of Section 24, Block 4, H. & T. C. Golding & Cochran and others' No. 1 W. T. Waggoner-E, 205 feet south and west of the NE cor. of the SW of Section 4, Block 17, H. & T. C.

In Young County — The Texas Company's No. 1 Eddleman Brothers, 2,000 feet north and 1,000 feet east of the SW corner of Section 1, T. & N. O. Survey.

ATLANTIC COAST PORT RECEIPTS REACHED NEW RECORD IN 1927

By N. O. Fanning

New York Bureau, The Oil and Gas Journal, Room 629, No. 101 Park Avenue, New York, N. Y.

NEW YORK, Feb. 18. — Receipts of crude and refined oil at Atlantic Coast ports by tanker reached a new high record in 1927 of 212,944,000 bbls., compared with the previous record of 193,166,000 bbls. in 1926. During the four years ended December 31, 1927, receipts are estimated at 762,373,000 bbls.

These figures indicate the magnitude of oil consumption on the Atlantic Seaboard, representing as they do oil either going into Atlantic Coast consumption direct, or refined in Atlantic Coast refineries for the domestic or export trade.

Of the 212,944,000 bbls. received by tanker in 1927, 131,537,000 bbls. were from Gulf Coast ports of the United States, as against 119,230,000 bbls. from the same source in 1926. The Pacific Coast contributed 31,280,000 bbls. in 1927, compared with 27,619,000 bbls. in 1926. The total contribution from domestic fields, therefore, can be estimated at 162,817,000 bbls., or 76.4 per cent, as against 50,127,000 bbls., or 23.6 per cent, imported. In 1926, of the 193,166,000 bbls. received, 146,849,000 bbls. were from domestic fields, or 76.0 per cent, while imports were 46,317,000 bbls., or 24.0 per cent.

The following table shows estimated monthly receipts of crude and refined oil by tanker at Atlantic Coast ports for 1927, from all sources (figures in barrels):

Month	Gulf Coast	Pacific Coast	South America	Mexico	Total
December	16,719,000	2,119,000	4,498,000	1,153,000	18,489,000
November	9,870,000	1,851,000	3,250,000	1,310,000	16,281,000
October	9,735,000	3,040,000	2,855,000	1,195,000	16,828,000
September	10,098,000	2,927,000	2,986,000	2,071,000	18,082,000
August	12,297,000	2,764,000	2,437,000	2,521,000	20,019,000
July	12,574,000	2,593,000	2,034,000	2,415,000	19,616,000
June	11,479,000	3,548,000	1,426,000	2,934,000	18,487,000
May	10,329,000	1,801,000	1,652,000	2,793,000	16,575,000
April	11,734,000	2,774,000	1,882,000	2,087,000	18,477,000
March	10,841,000	3,164,000	2,462,000	1,148,000	17,615,000
February	10,572,000	2,481,000	1,369,000	1,141,000	15,563,000
January	11,286,000	2,218,000	1,866,000	1,542,000	16,912,000
Total	131,537,000	31,280,000	28,717,000	21,410,000	212,944,000

The imports in 1927 of 50,127,000 bbls. consisted of 21,410,000 bbls. from Mexico, against 33,321,000 bbls. in 1926; and 28,717,000 bbls. from Venezuela, Colombia, Peru, Trinidad and Ecuador, combined, compared with 12,996,000 bbls. in 1926.

The following table shows estimated annual receipts of crude and refined oil by tanker at Atlantic Coast ports since January 1, 1924, from all sources (figures in barrels):

Year—	Gulf Coast	Pacific Coast	South America	Mexico	Total
1927	131,537,000	31,280,000	28,717,000	21,410,000	212,944,000
1926	119,230,000	27,619,000	12,996,000	33,321,000	193,166,000
1925	112,506,000	22,713,000	3,981,000	37,082,000	176,282,000
1924	93,947,000	44,845,000	2,881,000	38,308,000	179,981,000
Total	457,220,000	126,457,000	48,575,000	130,121,000	762,373,000

Imports from Mexico in 1927 show a decline of 11,911,000 bbls. or 35.7 per cent, compared with those for 1926. Imports from all other countries increased 15,721,000 bbls., or 121.8 per cent.

Monthly Movement

The receipts of oil by tanker at Atlantic Coast ports maintained a fairly steady monthly rate reaching a maximum in August of 20,019,000 bbls., a record. Subsequently, shipments fell off somewhat but maintained a comparatively high rate for the winter. The receipts for the closing month of December amounted to 18,489,000 bbls., second only to the record August movement.

Receipts from the Gulf Coast reached their maximum in July of 12,574,000 bbls They fell off to their lowest ebb in October and November, the October receipts amounting only to 9,738,000 bbls. Receipts from the Pacific Coast rose to the high monthly rate of 3,548,000 bbls. in June, and continued at an irregular pace the remainder of the year. At the close of the year they seemed to be on the increase.

The following table shows estimated monthly receipts of crude and refined oil by tanker at Atlantic Coast ports for 1927, from all sources (figures in barrels):

South America Increase

The feature of the monthly import movement into Atlantic Coast ports was the rapid rise in imports from the South American countries, principally Venezuela. Included in this grouping are Venezuela, Colombia, Ecuador, Peru and Trinidad. Although Trinidad is not geographically part of South America, it can be rightly placed in the South American group because of its proximity to Venezuela. Ecuador is only a small factor, contributing several cargoes during the year.

The South American group contributed 4,498,000 bbls. in December, or more than one-sixth of the total contribution for the year, indicating that this group will be a much larger factor in 1928 than in 1927.

Receipts From Gulf

The Port Arthur district accounted for the largest receipts at Atlantic ports by tanker from the Gulf in 1927, 60,237,000 bbls. of the total of 131,537,000 bbls. The Houston district closely approximated this record, with 53,536,000 bbls. The Baton Rouge-New Orleans district accounted for only 16,407,000 bbls. In 1927

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the first shipments were received from Corpus Christi following the completion of a new pipe line to that port from West Texas. The port contributed 1,357,000 bbls. up to the end of the year from the time the first shipment was received in October.

Receipts from the Port Arthur district, including Port Arthur, Sabine and Beaumont showed a big gain in the middle of the year, reaching a maximum of 6,886,000 bbls. in July and falling off to 4,194,000 bbls. in November. Receipts from Houston showed an unusually steady rate throughout 1927.

West Texas is expected to exert a strong influence on the movement during 1928, as a result of increased pipe line facilities leading from that district to the Gulf Coast. The present connections are with Corpus Christi, Houston and Port Arthur, so that all ports should reflect the expected growth in output of the West Texas fields.

The following table shows estimated monthly receipts of crude and refined oil by tanker at Atlantic Coast ports for 1927, from principal Gulf Coast divisions (figures in barrels):

Month—	Baton Rouge and New Orleans	Port Arthur, Sabine and Beaumont	Houston, Texas City and Galveston	Corpus Christi
December	1,487,000	4,243,000	4,629,000	360,000
November	865,000	4,194,000	4,253,000	558,000
October	1,056,000	4,433,000	3,810,000	439,000
September	1,281,000	5,349,000	3,468,000	.....
August	1,435,000	6,040,000	4,822,000	.....
July	1,256,000	6,886,000	4,432,000	.....
June	1,144,000	5,474,000	4,861,000	.....
May	1,222,000	4,461,000	4,646,000	.....
April	1,000,000	5,367,000	5,367,000	.....
March	1,470,000	4,721,000	4,650,000	.....
February	2,114,000	4,331,000	4,127,000	.....
January	2,077,000	4,738,000	4,471,000	.....
Total	16,407,000	60,237,000	53,536,000	1,357,000

Receipts from the Port Arthur district in 1927 alone were larger than the imports from all countries, combined. The same is true of the Houston district.

TANK WAGON LIST IN 50 CITIES INDICATES PRICES ARE AT BOTTOM

Only minor changes were made in the tank wagon prices in The Oil and Gas Journal's 50 representative cities during January. Apparently retail prices in general are on bottom. The few changes that were made affected only points in the central and eastern portion of the country and these were scattered. The tendency was to adjust prices to meet local conditions when necessary, rather than make any general change.

The average price on February 1 was 14.25 cents which is very near the average on the first of the year of 14.29 cents. But compared to a year ago, the price on February 1, 1928, is 3.22 cents lower. This represents a loss of nearly $1,000,000 daily to the oil industry. Despite the general tendency for prices to become more stable several new lows were established. In Hartford, Conn., for instance, a new low of 16.0 cents was established on January 18, the low for 1927 being 18.0 cents. Springfield, Mass., and Dallas, Tex., also has lower prices now than at any time during the last year, the new prices being 1 cent lower than any of last year.

The outlook for higher prices during 1928 is still very hazy. Some point to the continued willingness on the part of many refiners and marketers to set or meet abnormally low prices in order to move a large volume of material, and show that as long as there is plenty crude and gasoline available prices will not improve. Undoubtedly sufficient crude oil and gasoline production are assured to more than meet the demands for the next six months at least and while conditions may be materially changed over the last half of 1928, there is little likelihood of any material general advance in the immediate future. Except for the adoption of a 4-cent tax to replace the 3-cent tax by the State of New Hampshire, there were no changes. This change makes the average tax in the 50 cities 3.1 cents and represents about 16 per cent of the total cost to the consumer.

AVERAGE TANK WAGON PRICE IN 50 CITIES

(Exclusive of tax)

February 1, 1926	16.213
March 1	17.267
April 1	18.517
May 1	18.487
June 1	19.607
July 1	16.697
August 1	19.697
September 1	19.587
October 1	19.167
November 1	18.187
December 1	17.607
January 1, 1927	17.567
February 1	17.469
March 1	17.007
April 1	16.160
May 1	15.320
June 1	14.720
July 1	14.86
August 1	14.89
September 1	14.62
October 1	14.39
November 1	14.32
December 1	14.21
January 1, 1928	14.29
February 1	14.25

GASOLINE PRICES EFFECTIVE FEBRUARY 1, 1928

Table showing gasoline tank wagon prices as of February 1, 1928, exclusive of taxes in 50 representative cities, including the amount and the date of changes since January 1, 1928. High and low prices and state taxes also given.

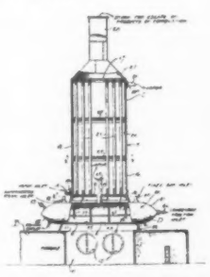
	Prices Jan. 1	Jan. changes	Prices Feb. 1	High and Low 1927		High and Low 1926		Tax Feb. 1, 1928
Birmingham, Ala.	14.0	....	14.0	18.0	14.0	20.0	16.0	4.0
Phoenix, Ariz.	19.0	....	19.0	19.0	16.0	22.0	19.0	3.0
Little Rock, Ark.	11.0	....	11.0	15.0	11.0	18.0	14.0	5.0
San Francisco, Calif.	14.0	....	14.0	14.0	9.0	16.0	13.0	3.0
Denver, Colo.	13.0	....	13.0	18.0	13.0	20.0	16.0	3.0
Hartford, Conn.	18.0	18 16.0	16.0	22.0	18.0	21.0	17.0	2.0
Dover, Del.	16.0	....	16.0	19.0	16.0	20.0	17.0	3.0
Jacksonville, Fla.	13.0	....	13.0	16.0	10.0	19.0	12.0	5.0
Atlanta, Ga.	13.0	....	13.0	18.0	10.0	21.0	14.0	4.0
Boise, Idaho	19.5	....	19.5	22.5	19.5	24.0	20.0	4.0
Peoria, Ill.	9.0	....	9.0	18.2	9.0	19.2	10.5	2.0
Chicago, Ill.	14.0	....	14.0	17.0	14.0	18.0	15.0	2.0
Indianapolis, Ind.	10.2	25 11.2	11.2	18.2	10.2	19.2	16.2	3.0

	Prices Jan. 1	Jan. changes	Prices Feb. 1	High and Low 1927		1926		Tax Feb.1, 1928
Des Moines, Iowa	11.9	....	11.9	16.0	9.9	19.5	16.0	3.0
Wichita, Kans.	10.8	30 11.8	11.8	15.8	10.8	16.8	14.8	2.0
Louisville, Ky.	13.0	....	13.0	17.0	13.0	20.0	17.0	5.0
New Orleans, La.	12.5	....	12.5	14.5	11.5	17.5	13.5	†3.0
Augusta, Me.	17.0	..	17.0	22.0	17.0	21.0	17.0	4.0
Baltimore, Md.	16.0	....	16.0	19.0	16.0	19.0	15.0	4.0
Springfield, Mass.	18.0	18 16.0	16.0	22.0	12.0	21.0	17.0	...
Detroit, Mich.	11.8	....	11.8	18.8	11.8	19.8	16.8	3.0
Duluth, Minn.	12.5	....	12.5	19.5	12.5	20.5	15.5	2.0
Natchez, Miss.	12.5	....	12.5	15.5	12.5	18.5	15.5	4.0
Kansas City, Mo.	10.9	....	10.9	17.9	10.9	18.9	15.9	†3.0
Helena, Mont.	19.5	....	19.5	22.0	19.5	24.0	21.0	3.0
Omaha, Neb.	12.25	....	12.25	14.25	12.25	19.25	14.25	2.0
Reno, Nev.	18.0	..	18.0	18.4	15.0	19.5	16.5	4.0
Newark, N. J.	16.0	.. ..	16.0	19.0	16.0	19.0	15.0	2.0
Albuquerque, N. M.	16.0	....	16.0	20.0	16.0	26.5	20.0	5.0
New York, N. Y.	17.0	....	17.0	22.0	17.0	21.0	17.0	...
Charlotte, N. C.	16.0	....	16.0	19.0	16.0	19.5	15.5	4.0
Fargo, N. D.	12.0	....	12.0	20.9	12.0	21.0	18.9	2.0
Cleveland, Ohio	14.0	....	14.0	19.0	14.0	20.0	16.0	3.0
Tulsa, Okla.	10.0	.. ..	10.0	15.0	10.0	17.0	13.0	3.0
Portland, Ore.	14.5	....	14.5	14.5	11.0	16.0	13.0	3.0
Philadelphia, Pa.	15.0	....	15.0	19.0	12.0	20.0	17.0	†3.0
Providence, R. I.	17.0	....	17.0	22.0	17.0	21.0	17.0	2.0
Charleston, S. C.	15.0	....	15.0	19.0	15.0	19.5	15.0	5.0
Huron, S. D.	14.5	....	14.5	19.5	11.5	20.5	14.0	4.0
Memphis, Tenn.	12.0	16 14.0	14.0	15.0	10.0	18.5	13.5	3.0
Dallas, Tex.	11.0	28 9.0	9.0	13.0	10.0	17.0	13.0	3.0
Salt Lake City, Utah	16.5	....	16.5	20.5	16.5	22.5	18.5	3.5
Burlington, Vt.	17.0	....	17.0	22.0	17.0	21.0	18.0	2.0
Norfolk, Va.	16.0	....	16.0	18.0	16.0	19.0	15.0	4.5
Washington, D. C.	16.0	..	16.0	19.0	16.0	19.0	15.0	2.0
Charleston, W. Va.	16.0	....	16.0	18.0	16.0	19.0	15.0	4.0
Milwaukee, Wis.	13.1	....	13.1	18.1	13.1	19.1	16.1	2.0
Casper, Wyo.	14.0	....	14.0	18.0	14.0	20.0	17.0	3.0
Seattle, Wash.	14.5	....	14.5	14.5	11.0	16.0	13.0	2.0
Minneapolis, Minn.	11.0	..	11.0	15.2	11.0	20.2	15.2	2.0
Average price	14.29	.. ..	14.25	18.15	13.55	19.717	15.713	3.1

†State tax 2 cents, remainder city tax.
Based on dumps of 50 gallons within the Standard Oil Co. of Indiana territory where quantity discounts are given. Actual tank wagon prices in the territory are 1 cent higher except in Chicago.

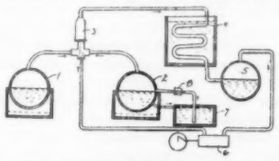
Recent Patents

1,654,577. Conversion Apparatus for Refining Hydrocarbon Materials. Russell K. Collins, Fort Worth, Tex., assignor, by direct and mesne assignments, to Collins Process, Inc., Wilmington, Del., a corporation of Delaware. Filed May 18, 1922. Serial No. 561,925. 6 Claims (Cl. 196—99.)



1. As an article of manufacture, a cylindrical-shaped expander including a casing having side, top and bottom walls, spaced flues mounted longitudinally within the chamber of said casing opening at the ends thereof outwardly of the top and bottom walls, said casing having inlet and outlet openings disposed respectively adjacent the bottom and top walls thereof, and perforated nickel baffle plates disposed within the chamber of said casing intermediate the inlet and outlet openings thereof.

1,655,741. Treating Hydrocarbons. Alfred Scharwz, Montclair, N. J., assignor, by mesne assignments, to Coal & Oil Products Corp., New York, N. Y., a corporation of Delaware. Original application filed February 13, 1923. Serial No. 618,758. Divided and this application filed May 8, 1923. Serial No. 637,617. 2 Claims. (Cl. 196—97.)



1. The process which comprises vaporizing predetermined proportions of low boiling saturated hydrocarbons and high boiling unsaturated hydrocarbons, mixing the vapors intimately, condensing the same and returning uncondensed hydrocarbons after compressing the same to the vapors that are being mixed.

DRILLING AT BOLIVAR

BRADFORD, Pa., Feb. 18.—The Forest Oil Corp. has let contracts for the drilling of 75 flood and oil wells on the Burdick and Reed farms, town of Bolivar, where 12 strings of drilling tools will soon be in operation. It will require about three months to complete these wells. The survey was recently completed for this drilling campaign, it being what is known as a five-spot field. The Forest Oil Corp. owns and operates hundreds of wells in the Allegany oil field, having drilled a total of 225 wells in a previous drilling campaign. The Messer Oil Corp. also is drilling 120 wells on the Patterson farm, formerly owned by A. L. Shaner, Bolivar Township, where more than 30 have been completed.

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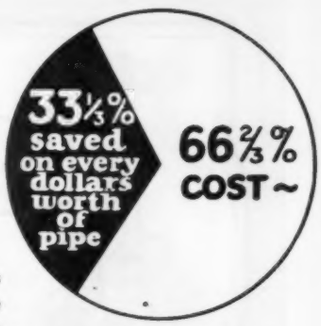

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INTELLIGENT AND EFFECTIVE CAMPAIGN OF EDUCATION

The Inland Oil Index of Casper, Wyo., February 10 published the following editorial by A. J. Hazlett, editor, one of the oldest oil writers in the industry:

Oil men have frequently favored suggestions for conducting a campaign of education by which legislators and especially members of Congress at Washington might understand the basic facts respecting the petroleum and natural gas industries. Such plans have never been carried into effect in a more comprehensive way and with better results than those of The Oil and Gas Journal of Tulsa, Okla.

Four years ago The Oil and Gas Journal published "The Oil Industry's Answer" and within the last few weeks an entirely up-to-date edition of this work has been published entitled "The Oil Industry's Answer Today." The leading articles in both of these editions were reproduced in book form and met wide distribution. In the case of "The Oil Industry's Answer Today," a rather phenomenal response was received to this effort to educate the country respecting the basic facts that are faced by every oil operator, refiner and distributor.

More than two dozen subjects are discussed by members of the staff of The Oil and Gas Journal and by others prominent in the industry.

The basic cause of the overproduction of oil is discussed as is the subject of legislation that may be applied to assist the economic conduct of the business. The book shows what the industry itself has done to control production and reviews the progress that has been made in the recovery of oil. It relates the disastrous result of overproduction with special application to the Seminole oil field. It explains how the industry has conserved oil, the application of scientific methods in finding oil, economies in use, the cheapness of gasoline, costs of refining and the relation between the prices of gasoline and crude oil, the tremendous loss resulting from dry holes, the increase in drilling costs, service rendered the nation during the Great War, efforts to reduce fire loss and various intricate problems connected with production. It tells how gasoline and kerosene are made and the saving that comes from standardization, how competition dictates prices, how state gasoline tax has rapidly increased, the great progress in methods of refining and the absolute lack of waste in the handling of oil after production.

Each of these articles was written so that the uninformed reader may be assisted in arriving at some logical conclusion respecting the wisdom of legislation to afford relief from defects with which every oil man is familiar.

The staff of The Oil and Gas Journal not only devoted their labor to producing this defense of the industry against attacks of uninformed people, but a plan was devised by which this knowledge should come into the possession of members of Congress and of legislators in the chief oil-producing states. One morning in Washington every senator and member of the House of Representatives found on his desk a bound copy of this publication together with a special communication calling his attention to it.

The result of that campaign of education is shown in The Oil and Gas Journal of January 26, which carried several pages acknowledging the receipt and giving evidence of the interest felt in this publication from members of Congress, public men in Washington, members of state legislators and many people of prominence in the industry. These many hundreds of communications show that public men can be aroused to the point of interest in this subject of nation-wide importance and the reception of the book forebodes a much more just and reasonable consideration of legislation that may be proposed than could have been obtained without effort of this kind.

The Committee of Nine instituted by Secretary Work of the Department of the Interior, chairman of the Federal Oil Conservation Board, has formulated principles to be incorporated into a law by Congress for the purpose of promoting conservation and the Federal Oil Board now has that report and will in the near future make public its view respecting the recommendation it may make for legislation.

It has remained for The Oil and Gas Journal to put into effect an intelligent and effective campaign of education in the interest of conservation of oil and gas, and to point out the essential needs of the industry and suggest the kind of legislative effort that should be devoted to accomplish these purposes.

ACTIVITY IN MEXICO IS BEING RESTRICTED

MEXICO CITY, Feb. 17. (By Trens Agency) — Several petroleum companies operating in Mexico are planning to materially restrict their operations in the near future, according to statements published here. Among those specifically mentioned as adopting such a policy of restriction are the Huasteca Petroleum Co. and the Transcontinental Petroleum Co. While no official statement on the matter has yet been forthcoming, it is reported that the Huasteca has already filed official notice with the Petroleum Agency in Tampico of the Department of Industry, Commerce and Labor, of the adoption of this policy. The reduction in the field is expected to be 60 per cent and in its refining plant 50 per cent.

The Transcontinental is stated to have received instructions from its parent company in New York to adopt a similar policy.

The Huasteca company has already started to put this policy into effect, both in the field and in its refineries. This step is now reported to have been premature as the company had not consulted with the Mexican authorities regarding the manner of indemnifying the laborers discharged. Officials of the government are now investigating this phase of the situation. It is understood that the Transcontinental will start its curtailment program during the latter part of this month, although no announcement has yet been made.

Fields in which the Huasteca is reported to have stopped work are Cerro Azul, Juan Felipe, Tierra Blanca, San Jeronimo, Ebano, Zacamixtle, Los Naranjos and Chapopote Nunez.

Construction work on the refinery at Mata Redonda is also reported to have stopped.

The restriction policy of these companies is considered as resulting from the present excess petroleum production in the world markets rather than to any causes essentially Mexican or resulting from the so-called petroleum controversy. The cost of production in the Mexican fields at the present time is considered to be in excess of the market price, with the companies operating at a loss.

While the effect on Mexican revenue derived from petroleum production and export will be considerable, the greatest preoccupation is being shown regarding the large number of employes which will be left without work.

What action may be taken by other companies has not been indicated, but several may be expected to follow the lead of these two. Others, like El Aguila, British owned, are operating under somewhat different conditions and show a tendency to continue with their present general development policy.

BUYS STATIONS

The Pennzoil Co. of Oil City, Pa. has purchased the wholesale and retail properties of Roberts and White, including three filling stations and a bulk station at Oil City, Pa.

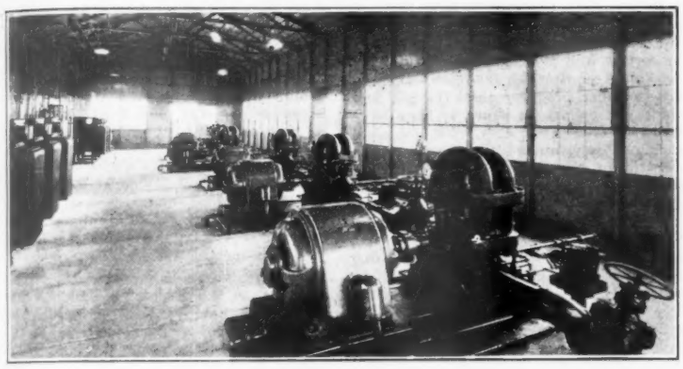
CENTRIFUGAL OIL LINE PUMP AS A FACTOR IN SEMINOLE AREA

By V. P. Gerbereaux

Flush production in the Seminole Field made it essential that pipe line companies equip themselves quickly to handle the overcapacity. The laying of completely new lines was an expensive undertaking and as it would take months to get a new line in operation such delay meant storing large quantities of oil at the field. This meant failure to take advantage of the flush production and financial loss. The only solution was to boost the capacity of existing lines. This could be done only by addition of pressure and meant placing intermediate or booster stations between existing stations.

The time and expense involved in the setting up of an oil engine-driven power pump station made this undesirable, especially since the investment required was very high. Power lines reasonably adjacent to the pipe lines made electric-driven pumps appear the logical solution. Electric power, however, was far from cheap and a very efficient pump would be many other favorable points in the use of the centrifugal pump. It not only cost less to install, but its simplicity cut the operating force to one man per station. The pump could be hooked directly on the line or on a by-pass thus eliminating the use of tanks and making use of the residual pressure coming into the station. The flow was smoother through the line, cutting down friction losses and decreasing the vibration in the line, thereby causing fewer line breaks and long life for the line. The pumps regulated themselves on various viscosities and it was never necessary to by-pass around them. The station was so simple and the pumps so small and light that if the demand on one line fell off it meant short work to move the units where they were needed.

These advantages were so apparent that for the moment power bills were not seriously considered or the importance of pump efficiencies. This is regrettable because when a year's operation shows the enormous power consumed the use of centrifugal pumps will again be questioned from this standpoint. Outside of temporary installations the compensating relation of pump efficiencies to power cost should be carefully considered.



Magnolia pipe line station at McKonie, Okla.

required. The use of the motor-driven power pump, however, meant the building of a substantial station and the breaking of the line and setting up of tanks at the new station. This, while less expensive than an oil engine station, still involved a large first cost. Nevertheless this was a more logical solution.

At this time, however, centrifugal pump manufacturers were, by testing their pumps on various crude oils, discovering how to build these pumps for high efficiencies on oils, even when generating high pressures. Whereas the centrifugal pump with 60 per cent efficiency would use far too much power, one with 75 per cent to 80 per cent would use very little more than the power pump on the same service.

Pipe line companies were quick to realize this development would be to their advantage. Centrifugal pumps had been used on oil lines for loading service and for small temporary lines and their smooth operation and ease and simplicity of installation were known. First cost on this type of pump was known to be far below that of any other type of pumping unit. Therefore, manufacturers of centrifugal pumps were invited to study the requirements and to make trial installations in booster stations.

Due to the varying capacity it was decided that the best operation would be to put two pumps in series to generate the required station pressure of 600 pounds to 750 pounds as the case might be, and when the full capacity was not available to run only one pump and boost the pressure only half as much. This would mean better overall pump and motor efficiency than if a variable speed motor were used. The results of the trial installation were very satisfactory.

Careful study of the operation of these pumps showed the possibility of using automatic control to simplify the problem. A control was developed which, by means of pressure switches, permitted either or both pumps to be automatically thrown on or off the line.

The pipe line operators soon discovered that for the moment power bills were not seriously considered or the importance of pump efficiencies. This is regrettable because when a year's operation shows the

The use of centrifugal pipe line pumps has not been limited to booster stations. Recent installations have been made where this type of pump is used to pump from the field tank farm into the line, as the initial pumping station.

KENTUCKY-TENNESSEE

(Continued from Page 58)

the drill and the well filled up as soon as the pay was struck. Jordon, Short and others are drilling No. 3 on the Gilbert Jolly farm, same county. The Leeper Oil Co. is drilling a well on the Nance farm for Fred Weir, adjoining the Jolly farm.

H. A. Henry is arranging to drill a test on the Dick Murphy farm, near West Louisville, and will be the first test in that part of Daviess County, the nearest test to this new venture being the dry hole drilled by the Ohio Oil Co. on the McLimore farm in the Panther area. A deep test will be made of the Murphy well in case commercial production is not found at a shallower depth.

A rig has been ordered by Miller and Damron, claimed to be the heaviest outfit brought into the Owensboro Field. The outfit will be unloaded at Utica, in Daviess County.

In Ohio County the Creek Drilling Co. is drilling No. 8 on the Bartlett heirs' 81 acres. Mecca Oil Co. is drilling No. 11 Cora Wells 130 acres; James C. Ellis is drilling No. 1 Barney Taylor 42 acres, and Buckner and others are drilling No. 3 on the E. G. Owen 80 acres. Medley Brothers are working at a test on the Jewell farm, while Young & Lee are doing the same at No. 3 on the Ollie Ezell 80 acres.

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MODEL D

SUPER - HEATER

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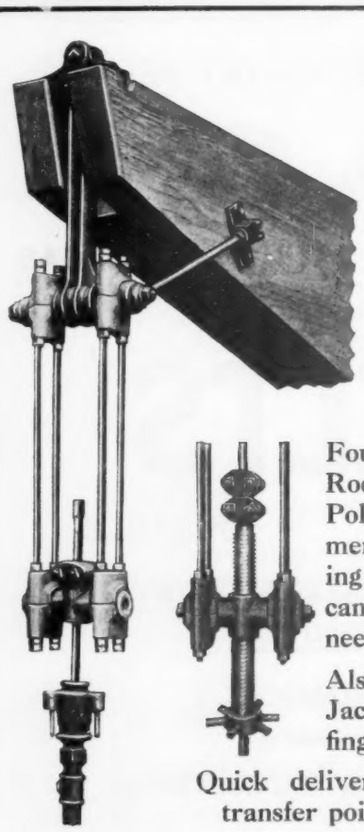
North Kansas City, Mo. U.S.A.



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Unsurpassed for strength and long wear. Heavy enough for the deeper wells.

Four one-inch Suspension Rods. Plain steel yoke for Polish Rod regular equipment, but our Ball Bearing Temper Screw Yoke can be furnished where needed.

Also Lightning Powers—Jacks — Swings — Stuffing Boxes, etc.

Quick deliveries from convenient transfer points or from factory.

Kansas City Hay Press Co.

Kansas City, Mo.

oil leasers for prospective drilling is becoming more general since the discovery in the southwestern part of the county of oil in small quantities. Miller and Damron, as well as other operators, are reported obtaining leases on large tracts. It is the general belief that the oil territory continues westward from Daviess County and that paying pools will be discovered across the Green River section. Virtually all of the land west of Owensboro to Green River in Daviess County has been leased and will be drilled as quickly as rigs can be brought into the territory. Probably a dozen new rigs en route to the Owensboro Field, and the territory immediately west of Owensboro is being blocked off preparatory to starting right at an early day, or as soon as material can be handled over the roads. Much territory around Sorgho has been blocked off recently for drilling.

Tennessee

The big producer reported completed in Clay County, Tennessee, is the Carnahan Oil Co. and others' second venture on the Joe Moredock farm on Ashburn Creek, about 4 miles east of the town of Willow Grove, in the eastern part of Clay County. The well started with a flow of 50 bbls. an hour, and is reported to have dropped to 40 bbls an hour for the first 24 hours, with a production of 960 bbls. making it the largest and most sensational well for the Volunteer State in 30 years. In fact, it is a larger producer than the old well which was owned for years by Miss Jane Stone, of New York City, now deceased. Thomas Percy, an old-time Pennsylvania operator of Bradford, Pa., later a large operator in the Ohio and Indiana Fields, and at one-time president of the Western Oil Men's Association of Toledo, Ohio, who passed away some few years ago, was interested in the Bob Bars well, and is reported to have spent $30,000 in an effort to find another similar well. The only thing he got for his investment, as he used to say, was a fine hand-made quilt, which was seen many times by the writer at his home in Toledo.

The last report from the No. 2 Moredock was that it was flowing as strong as it did for the first 24 hours. The heavy pay was found at a depth close to 750 feet and was drilled 151 feet below the Pencil Cave formation. The production in this well does not come from the Upper or Lower Sunnybrook sands, but N. M. Sauls, geologist, reports it comes from the Ordovician lime, from which he claims all Tennessee oil comes. The initial venture on the Moredock farm was reported to have found its pay in the second Sunnybrook sand at a depth of 485 feet and produced 70 bbls. a day and is still maintaining that average. No. 2 is said to have got its flow from a 5-foot strata of Bentonite, which is below the Pencil Cave.

Steel Production During Past Month Heaviest Since May

By B. E. V. Luty

PITTSBURGH, Pa., Feb. 20.—There are widely divergent opinions as to the real status of the steel trade at the present time. A very favorable opinion is expressed by those who take surface indications, such as the 25 per cent increase in steel production from December to January, the January increase of 303,073 tons in the Steel corporation's unfilled obligations, when in January of both 1927 and 1926, there was a decrease, and as a third point the various advances announced in steel prices.

Those who take an unfavorable view, or rather refuse to accept a very favorable view, point out that advanced prices have not really been obtained on any considerable tonnage of steel and that the price advances in fact were presumably the cause of the heavier buying. They argue that the advanced prices have not had any very serious test, and that they may not stand the test well when the time comes, for then the sellers may be more in need of additional orders than buyers are in need of additional supplies. It is pointed out also that while there has been a large increase in steel production, such increase has occurred at this time every year for a long time and should therefore be considered simply seasonal.

Production of steel ingots in January was about 3,990,000 gross tons, representing an increase of 25.7 per cent over production in December. This was the heaviest production for any month since May, 1927, but at the same time it was merely equal to the average of January production in the three preceding years, and thus the increase may be regarded as seasonal.

The Steel corporation's unfilled obligations increased 303,073 tons in January, as noted above, making the fourth month of increases, with a total increase of more than 1,000,000 tons. Part of this increase was due to the annual rail buying movement.

Price Advances

Announcements by mills of advances in prices continue to occur, the item in the past week being advances in bands, hoops and hot rolled strips, about $2 a ton. This is the second advance and of course is not fully effective at present, there being indeed some question whether the first advance is altogether effective. In this as in other lines advances in quotations are complicated by mills sometimes selling far ahead at old prices so that an advanced price may be technically in effect without consumers actually paying it to any extent. The market seems to be quotable at 2.20 to 2.40 cents for hoops under 3-inch, 2.10 to 2.20 cents for 3-inch and under 6-inch, and 1.90 to 2.00 cents for 6-inch and under 12-inch.

In bars, shapes and plates the recent advance to 1.85 cents is holding, and mills have not yet signified willingness to book second quarter business at this figure, so that there may be another advance, to 1.90 cents. Current contracts are at 1.80 cents.

Tubular Trade

The tubular goods trade has shown no developments of consequence in the week. Pipe mills are running at about 60 per cent, while seamless tube mills are at under that rate. Production of line pipe is lighter than it was and the orders now being filled have not much longer to run. On the other hand there is a steady though slow increase in demand for standard pipe and of late there has been more demand from California for oil country goods.

Pipe prices are well maintained by mills. In the secondary market there is shading by jobbers in a few sections, but on the whole price conditions are about as steady as they usually are.

The market in Connellsville furnace coke for spot shipment has stiffened 15 cents, being now at $2.75 to $2.85, as a result of just a little buying. Prospects are only fair.

The valley pig iron market remains very dull, in contrast with activity in several other districts.

SWEDISH AVIATION FUEL

The Swedish government is experimenting with a new Swedish motor fuel for use in the air corps. This motor fuel consists of 75 per cent gasoline and 25 per cent sulphid alcohol. The production of sulphid alcohol for 1926 amounted to 14,000,000 liters while it is estimated that the factories have a capacity for making 38,000,000 liters a year. It is hoped that by increasing the production of sulphid alcohol for use in preparing this new fuel that it will be possible to reduce the annual import of gasoline.

POSSIBILITIES IN PAPUA

Cecil Clark, chief driller to the Anglo-Persian Oil Co., who is investigating oil prospects in Papua, has informed the Home Minister that there is a reasonable prospect of making the venture a commercial success.

KANSAS WILDCATS

(Continued from Page 44)

Walter & Warner's No. 1 Mitchell, SW cor. NE Sec. 14-31-23w ..... Shut down 600 ft.

CLOUD COUNTY

Concordia Producing & Refining Co.'s No. 1 Murdock, SE cor. SE Sec. 6-6-4w ..... Shut down 3,590 ft.

COWLEY COUNTY

Allison & Fitzwilliams' No. 1 Shapland, NE cor. NW SE Sec. 2-30-6 ..... Drilling 790 ft.
Derby Oil Co.'s No. 1 Seaman, NE cor. SE NE Sec. 32-30-3 ..... Drilling 2,712 ft.
John Herron and others' No. 1 Marshall, SW cor. NE Sec. 36-30-6 ..... Shut down 470 ft.; legal trouble.
Meridian Gas Co.'s No. 1 Roselle, SW cor. SE Sec. 8-35-1.. Drilling 1,741 ft.
Otstot et al's No. 1 Volker, NW cor. NE, Sec. 9-35-1 .... Rig.
Harris & Hahn's No. 1 Gamble, C NW NW Sec. 17-35-3 ..... Drilling 1,400 ft.
E. B. Shawver and others' No. 1 Disser, NW cor. NW Sec. 10-34-3 ..... Drilling 1,426 ft.
Vickers Petroleum Co.'s No. 1 Daniels, NE cor. NW Sec. 3-30-3 ..... Shut down 1,800 ft.

DICKINSON COUNTY

Harwood & Winters' No. 1 Utech, SW cor. SE NW Sec. 35-16-4 ..... Drilling 2,416 ft.
McBride & Goens' No. 1 Shirley, NE cor. SW Sec. 21-12-4 ..... Shut down 2,120 ft.

ELLIS COUNTY

J. H. Tatlock et al's No. 1 Leiker, NW cor. NE NE, Sec. 26-13-16w ..... Sand, 3,237-40 ft; 10 bailers of water; shut down.

GRAHAM COUNTY

Gulf Coast Oil Co.'s No. 1 Johnson, SE cor. NE SW Sec. 27-8-25w ..... Shut down 3,270 ft.

GREENWOOD COUNTY

Carnes & Bly's No. 1 Smith, NE cor. SE Sec. 4-24-13 .... Rig.
O. W. Culp's No. 1 Smith, C NE SE Sec. 28-27-13 ..... Drilling 2,116 ft.
Eureka Oil Co.'s No. 1 Brothers, SE cor. NW Sec. 35-23-11 ..... Drilling 2,411 ft.
C. A. Devine's No. 1 Bradford, SW cor. NE Sec. 22-26-11 ..... Shut down 600 ft.
C. E. Hawks' No. 1 Lessman, SE cor. SW Sec. 14-21-10 .. Drilling 1,638 ft.
T. C. Johnson's No. 1 Knox, NE cor. NW Sec. 8-23-13 .... Shut down 1,705 ft.
Kismet Oil Co.'s No. 1 Richardson, SW cor. NE SW Sec. 26-22-11 ..... Location.
Sharpless and others' No 1 Corder, SW cor. SE SE Sec. 22-23-12 ..... Shut down 1,310 ft.
Smith & Rockhill's No. 1 McDair, NW cor. SE, Sec. 20-26-12 ..... Rig.

HARPER COUNTY

Barbara Oil Co.'s No. 1 Blunk, C NW NE Sec. 20-34-15w .. Fishing 250 ft.
Amerada Pet. Corp.'s No. 1 Mendiville, C SE SE, Sec. 24-34-6w ..... Drilling 4,139 ft.
Sam Jarvis' No. 1 Wyckoff, SW cor. NW Sec. 11-34-4w.. Shut down for orders 4,212 ft.
Sam Jarvis' No. 1 Warneke, SE cor. SW sec. 4-34-3w.... Shut down 4,207 ft.
Gypsy Oil Co.'s No. 1 Douglas, NE cor. SE NW Sec. 23-34-2w ..... Top Wilcox, 4,493 ft; T.D., 4,500 ft; est. 200 bbls; S.D.

JEFFERSON COUNTY

Wichita Oil Co.'s No. 1 Simpson, NW cor. SW SW Sec. 19-10-17 ..... Rigged up and shut down.

KINGMAN COUNTY

James Madison's No. 1 Ballein, SW cor. NW NW Sec. 21-28-5 ..... Drilling 3,523 ft.

LANE COUNTY

Robinson and others' No. 1 Dickerson, SW cor. NW SE Sec. 11-18-27w ..... Cleaning out 2,645 ft.

LOGAN COUNTY

W. H. Koons', Trustee No. 1 Edwards, NW cor. NW Sec. 14-14-33w ..... Shut down 4,310 ft.

MARION COUNTY

Anderson Brothers' No. 1 Benth, SE cor. SW SW Sec. 31-18-5 ..... Fishing 1,655 ft.
Givens and others' No. 1 Ucker, SW cor. NE Sec. 31-17-4 ..... Underreaming 1,820 ft.
Sun Ray Oil Co.'s No. 1 Lehrman, SW cor. NE SE Sec. 1-21-1 ..... Fishing bailer 2,750 ft.

MEADE COUNTY

Blackwell Oil & Gas Co.'s No. 1 Boyer, SE cor. NW SE Sec. 9-33-28w ..... 8-in. casing 3,205 ft.; total depth 3,315 ft.; shut down.

MORRIS COUNTY

Fisher & Louck's No. 1 Stroda, NW cor. SE Sec. 6-16-5 ..... Drilling 1,875 ft.
Graham Brothers' No. 1 Nelson, NE cor. SE Sec. 30-17-5 ..... Shut down 750 ft.
Moss & Nelson's No. 1 Smith, SW cor. SW Sec. 18-16-5 .. Rig.
Skelton and others' No. 1 Illes, NW cor. NW Sec. 25-16-5 ..... Rig.

McPHERSON COUNTY

Franks and others' No. 1 Wright, SW cor. NW NW Sec. 9-19-4 ..... Rig.
D. I. Hall's No. 1 Gray, NW cor. SE NW Sec. 20-20-3w ..... Spudded and shut down.
C. W. Lamer's No. 1 Lamer, SE cor. SW Sec. 1-17-3w .... U.R., 3,495 ft.
The Texas Company's No. 2 Chinberg, NW cor. NE NW Sec. 32-18-2w ..... Drlg. 2,016 ft.

OSBORNE COUNTY

Prather-Davis-Krueger's No. 1 Pruter, SW cor. SE Sec. 30-9-15w ..... Shut down 2,360 ft.

PAWNEE COUNTY

Frank Hopper and others' No. 1 Seifers, NW cor. SW NE Sec. 23-21-11w ..... Fishing bailer 3,418 ft.
F. C. Troupe's No. 1 Lovett, C EL NE NE Sec. 31-21-16w ..... Rig.

POTTAWATOMIE COUNTY

J. J. Crawford's No. 1 College, C W L SW NE Sec. 11-10-12 ..... Shut down 2,250 ft.

RENO COUNTY

Danciger Oil & Refining Co.'s No. 1 Williams, NW cor. SE SE Sec. 6-22-4w ..... Drilling 450 ft.
Stearns-Streater & Marshall's No. 1 Crabb, SE cor. SW NE Sec. 1-25-8w ..... Rig.

RICE COUNTY

Allison & Fitzwilliams' No. 1 Poland, NE cor. SW NE Sec. 36-19-8w ..... Cellar.

RILEY COUNTY

Mutual Oil Co.'s No. 1 Marks, SE cor. NE NW Sec. 26-10-6 ..... Shut down 2,400 ft.

ROOKS COUNTY

Keys Petroleum Co.'s No. 1 Rathburn, NE cor. SW Sec. 14-9-16w ..... Shut down 1,350 ft.
Krueger and others' No. 1 Poore, NE cor. NE Sec. 14-8-16w ..... Spudded and shut down.
Stearns & Streater's No. 1 Matheson, NE cor. SE NW Sec. 28-10-16w ..... Drilling 3,431 ft.

RUSH COUNTY

Valerious & Chenney's No. 1 Sheverman, NW cor. SE NW Sec. 27-17-17w ..... Spudded and shut down.

SALINE COUNTY

Cress & Hawkey's No. 1 Grendler, NE cor. SE Sec. 16-15-5 ..... Rig.
Hugh Faulders' No. 1 Wendt, SW cor. SE SE Sec. 18-15-5 ..... Rig.
Mento Oil & Gas Co.'s No. 1 Muir, SW cor. SW Sec. 17-15-2w ..... Underreaming 3,205 ft.

SEWARD COUNTY

T. B. Slick's No. 1 Pyle, NE cor. NE Sec. 14-33-33w ... Shut down 850 ft.

SHERMAN COUNTY

A. L. Henson and others' No. 1 Murry, NE cor. SE NW Sec. 22-7-4w ..... Shut down 2,650 ft.

SMITH COUNTY

Smith & Buchner's No. 1 Rice, SW cor. SW Sec. 18-5-15w ..... Rig.

STAFFORD COUNTY

Randall-Johnson's No. 1 Richardson, NW cor. SW Sec. 24-22-11w ..... Rig on ground.

WAUBANSEE COUNTY

Empire Gas & Fuel Co.'s No. 1 Schuaem, SE cor. SE Sec. 19-12-11 ..... Fishing 3,320 ft.

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Its quality and uniformity have never been questioned

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"The Working Barrel That Works"

Over sixty thousand now in use from Pennsylvania to Argentine and from Oklahoma to India wherever oil is produced.

No Barrel can compete with the McGregor in price and saving. It comes with the barrels, valves, valve stem all complete at a price slightly more than what the old style Barrel would cost. Pumps as fast as old style barrels that are attached to the tubing.

The only pulling done when you have a McGregor in use is the rods as the complete Barrel is fastened to the rods and comes out when they are pulled. TUBING PULLING is done away with as far as the Working Barrel is concerned. Made for all size tubing. Use "Mac" Ball and Seat.

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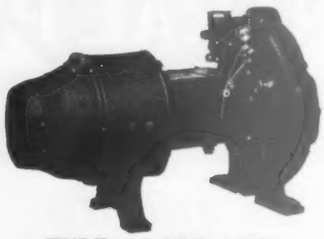

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Due to the fact that this lighting plant is equipped with 4 steam nozzles instead of the customary 2, it will carry its full load at 85 lbs. steam pressure just as efficiently as at 250 lbs.

When the load is heavy or the steam pressure low, all 4 nozzles can be turned on. However, when operating with excessively high steam pressure, or carrying just a light load, the 2 extra nozzles can be closed by means of shut-off valves. Think what this means in steam economy!

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Steel Oil Storage Tanks, Condensers,
Fabricated and Erected

RITER-CONLEY COMPANY
General Offices—Pittsburgh, Pa.

CENTRAL WEST FIELDS

(Continued from Page 58)

just a little east of north and south, the closure being from contour 300 feet below sea level to 508, making a closure of 208 feet. This is supposed to be the second largest dome in the State of Ohio.

In Salem Township, Auglaize County, Stelzer & Boyd's No. 5 well, 1,300 feet from the south line and 1,280 feet from the east line of the O. F. Benton farm, tapped the sand at 1,139 feet and went 49 feet in the sand, the well showing an initial of 5 bbls.

In Washington Township, Sandusky County, the Lindy Oil Co.'s No. 3, in the southwest corner of the John E. Boyer farm, in the southeast quarter of Section 11, pumped an initial of 8 bbls. from a total depth of 1,342 feet. Sand was topped at 1,290 feet, with 58 feet drilled into the sand.

In Jefferson Township, Mercer County, John Karsch's test, 400 feet from the north line and 175 feet from the west line of his farm, in the northwest quarter of Section 8, is a light gas producer at a total depth of 1,132 feet, or 37 feet in the sand.

The town of Paulding, the county seat of Paulding County, is complaining of the shortage of gas, which comes through a line from the Payne Field, same county, about 15 or so miles in length.

Central Ohio

No oil producers nor dry holes were reported for the week from the Central Ohio Field, although nine wells were completed and all gas producers, with a few new wells starting up and new locations staked. This work is being done in the face of seas of mud, high water and bad weather in general, which makes it almost impossible to get about the fields.

In Hanover Township, Ashland County, the Ohio Fuel Gas Co. has an average gas producer 660 feet from the north and west lines of the W. B. Cookley 40 acres, Section 20, and made a location for a test 660 feet from the south and west lines of the M. H. Kennedy 40 acres, in Section 19. The Logan Gas Co. drilled a light gas well at a test 1,000 feet from the south line and 700 feet from the east line of the S. A. Cline 72 acres, also in Section 19. Ohio Fuel Gas Co. is drilling a test 745 feet from the north line and 660 feet from the east line of the C. C. Ricketts 100 acres, Section 14, Orange Township, same county. Same company is drilling No. 2 on the Jacob Kettering 72 acres, Section 23, Green Township, same county, and the same company is starting a test 660 feet from the north and west lines of the William Conrad 80 acres, Section 32, same township. The Logan Gas Co.'s test, 660 feet from the south line and 950 feet from the east line of the Martin Trumpower 112 acres, same section, is a light gasser. Same company made a location for a test 660 feet from the north and east lines of the Lewis A. Bohn 80 acres, Section 12, Clear Creek Township, and drilling a test 660 feet from the south line and 1,000 feet from the east line of the G. R. Motter 101 acres, Lot 3, Troy Township, same county.

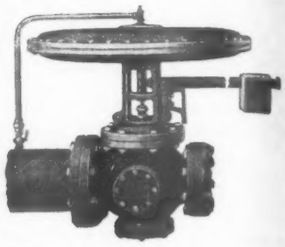
Medina County

In Medina County, Lafayette Township, the Ohio Fuel Gas Co. struck a nice gas well at a test 700 feet from the south line and 800 feet from the east line of the John H. Grim farm, Section 8, and made a location for a second test 800 feet south of the road and 300 feet from the east line of the William Ruder 63 acres, Section 14.

In Wayne County, Chester Township, B. B. Cameron is drilling a test on the Julia Iches farm, Section 5, and the Logan Gas Co. made a location for a test 660 feet from the north and west lines of the Peter Bagley 80 acres, Section 17. Same company staked a location for a test 725 feet from the north line and 660 feet from the west line of the H. S. Eckhard 83 acres, Section 11, Sugar Creek Township. In Congress Township, the Ohio Fuel Gas Co. made a location for a test 750 feet from the south line and 1,300 feet from the east line of the Ernest Stratton 100 acres, Section 4.

The Empire Gas & Fuel Co. is drilling

Always on the job!



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No chance for dangerous explosions.

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Organized 1884—oldest builders of gas regulators in the country. Built in all sizes, from 1 inch to 24 inches; for all services, 1 oz. up to 1,600 lbs. pressure to square inch.
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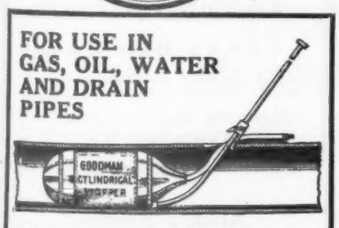

Safety Gas Main Stopper Co.
523 Atlantic Ave.,
Brooklyn, N. Y.

a second test 300 feet from the north line and 600 feet from the west line of the M. G. Bird 100 acres, Lot 10, Monroe Township, Holmes County. In Richland Township, the East Ohio Gas Co. drilled in an excellent gasser in a test 660 feet from the north and east lines of the Richard Roby 40 acres, Lot 14.

In the Cleveland Field, in Olmstead Township, Cuyahoga County, Goff Brothers' second test, 500 feet from the south line and 175 feet from the west line of the A. A. Dreyer 10 acres, Lot 27, is a good gas well. John Arthur's test, 400 feet from the north line of the A. W. Hurd 10 acres, same lot, and 75 feet south of the highway, is a light gas producer. Hulse & Kundtz's No. 3 well, on the A. W. Eldred 55 acres, Lot 29, is an average gas well, as is their No. 1 on the N. J. Paddock property, Lot 30. This firm is drilling No. 1 in the northeast corner of the F. Biddulph 5 acres, Lot 21. In the same township, John Arthur is drilling No. 1 on the F. W. and K. Silk 45 acres, Lot 34; No. 1, on the L. Bainbridge, Lot 23, and No. 2 on the G. W. Wagner, Lot 32. In Dover Township, John Arthur is drilling a test in the southwest corner of the V. H. Limpert 19 acres, Lot 5.

The Logan Gas Co. is drilling a test 300 feet from the north line and 960 feet from the west line of the R. E. Vanwinkle 76 acres, Section 14, Perry Township, Coshocton County.

Indiana Field

Another good producer has been added to the "Little Oklahoma Pool" in the southern part of Vigo County, in Prairie Creek Township, in western Indiana. The new find is the Ohio Oil Co.'s second test, 330 feet from the south and east lines of the W. F. Collins farm, in the NW of the NE, Section 31, and showed an initial production of 75 bbls. at a depth of 2,191 feet. This is a new pool opened up some few months ago by the Siosi Oil Corp.

In Clay Township, Pike County, William Bell and others' test, 200 feet from the south line and 450 feet from the west line of the Robert Hynuman farm, in Survey No. 4, came in a dry hole at 1,543 feet.

High waters in the streams over the western portion of the State have retarded work to a large extent. A. B. Bement is drilling No. 6 on the C. Waltz farm, Lot 14, Clay Township, Pike County, and Perry Andrews is starting his No. 10 on the Enoch Loveless farm, Section 14, Logan Township, same county. No. 9, on this farm, recently brought in showed an initial of 70 bbls. at 1,390 feet.

Illinois Field

The Illinois Field experienced a rather bad week, there being only three new wells, of which one was a 3-bbl. pumper, one a gas well and the other a duster.

The Ohio Oil Co.'s No. 49 well, 920 feet from the south line and 200 feet from the east line of the S. Boos farm, in the NW of the NE of the SE of Section 8, Bridgeport Township, Lawrence County, pumped an initial of 3 bbls. at 913 feet deep.

In Wabash Township, Wabash County, in the Allendale Field, the Adams Corner Oil Co.'s No. 14 well, 800 feet from the north line and 1,400 feet from the west line of the Mack Madden farm, in the northwest quarter of Section 7, struck a nice gas well with a volume of 800,000 feet in the Bridgeport sand at 1,098 feet. Top of the sand was found at 1,070 feet and drilled 28 feet in the sand. Foreman and others' test, in the northeast corner of the S. W. Pritchard farm, Section 3, was a dry hole at 1,620 feet.

At a conference of Ohio Oil Co. officials in Findlay it was decided to rebuild the company's office building at Marshall, Ill., which was destroyed by fire some time ago. There were rumors that the office would be removed to some other point, and the decision to rebuild at Marshall is gratifying news for that busy county seat. The new office building will be constructed of brick and work will start as soon as weather conditions are good.

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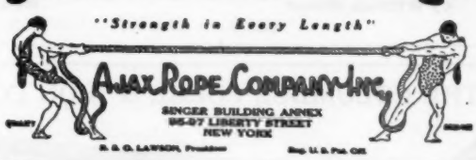

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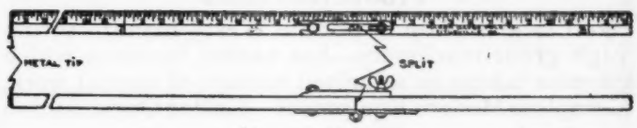

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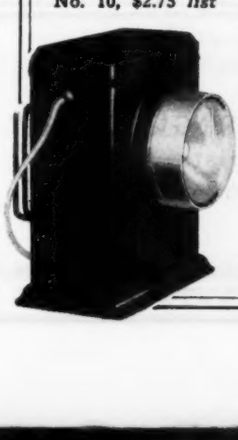

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TIDIOUTE LEASE PURCHASE

TIDIOUTE, Pa., Feb. 18.—The outlook on drilling in and around Tidioute this spring is improved with the announcement of the purchase of the Reck and Cooper lease, on Cropp Hill, Forest County, by J. P. Sage, H. L. Copeland, and associates. The deal comprises 825 acres which were purchased in fee, with 89 second and third sand wells. The company contemplates considerable improvement on the property, installation of power, cleaning out old wells and much new drilling. At the Hi Rock lease, Mr. Carroll, who is in charge, is reported as opening negotiations for the starting of drilling operations intending to drill 50 wells or more. This company has 600 acres, with 70 wells. They are reported drilling 15 wells last year with good showings.

FILLING STATIONS IN ICELAND

The new oil stations at Skarjafjord and Reykjavik, Iceland, have received their first cargo of petrol, a tanker having brought 4,400 tons to the stations. The four tanks have a capacity of about 7,000 tons, the present yearly consumption of Iceland. There are also now ready for use two smaller stations with tanks capable of holding 200 tons of petrol in the Vestman Isles and Akranes, and in the course of the winter tank stations will be built in Isafjord and Akureyri, and in two ports on the east coast. All these smaller tanks are intended for the use of the fishing cutters that belong to the various ports of the country.

LEGAL

SALE OF OIL AND GAS LEASES DEPARTMENT OF THE INTERIOR

Shreveport, Louisiana

Notice is hereby given that the following described lands in eight units in the known geologic structure of the Monroe Gas Field, Louisiana, are offered for lease under Section 17 of the act of February 25, 1920 (41 Stat., 437), at the customary sliding scale of 12½ to 33⅓ per cent of the quantity or value of the oil produced, of 12½ to 16⅔ per cent of the value of the gas produced and of 16⅔ per cent of the value of the natural-gas gasoline produced from each unit in accordance with the royalty schedule in the regular lease form, and the rental as required by Section 17 of the said act:

Unit No. 1.
T. 18 N., R. 4 E., Sec. 24, Lot 3, 9.24 acres.

Unit No. 2.
T. 19 N., R. 4 E., Sec. 8, NE¼ of NE¼, 40.00 acres.

Unit No. 3.
T. 19 N., R. 4 E., Sec. 30, Lots 1, 2, SE¼ NW¼, 106.70 acres.

Unit No. 4.
T. 19 N., R. 5 E., Sec. 10, SE¼ of SE¼, 39.82 acres.
T. 20 N., R. 5 E., Sec. 34, SE¼ of SE¼, 40.07 acres.

Unit No. 5.
T. 19 N., R. 5 E., Sec. 18, S½ of NW¼, Sec. 20, SW¼ of NW¼, Sec. 30, SW¼ of SE¼, 160.47 acres.

Unit No. 6.
T. 20 N., R. 3 E., Sec. 36, Lot 4, 15.80 acres.
T. 20 N., R. 4 E., Sec. 7, NW¼ of SW¼, 39.99 acres.

Unit No. 7.
T. 20 N., R. 4 E., Sec. 1, SE¼ of NW¼, Sec. 13, NW¼ of NE¼, 74.33 acres.

Unit No. 8.
T. 21 N., R. 5 E., Sec. 20, Lot 1; Sec. 29, NE¼ of SW¼; Sec. 33, Lots 2, 3, 4, 124.84 acres; all Louisiana Meridian, Louisiana, total, 651.26 acres.

The units are to be offered separately and are to be so considered as a basis for the payment of royalty, but any lessee may acquire two or more of the units in which the combined acreage does not exceed 640 acres.

The lands are offered for lease subject to the drilling of offset wells by the lessee first on lands adjacent to tracts on which commercial production of gas has been demonstrated, such drilling operations to be initiated within ninety days after the delivery of the executed lease, each succeeding well thereafter as required to be drilled by the terms of the lease shall be spudded in within ninety days of the completion of the drilling well, all drilling operations to be in conformity with the laws of the State of Louisiana and to be continuously and diligently prosecuted in accordance with the Federal oil and gas regulations.

Said leases will be offered for sale by public auction at the Federal Court Room, Shreveport, Louisiana, at 10 a. m., on February 27, 1928. The successful bidder must deposit on the date of sale, with the officer in charge of the sale certified check on a solvent bank, or cash, for one-fifth of the amount bid by him, and file the showing of qualifications to receive a lease required by Sec. 15 of said regulations.

Bidders are warned against violations of the provisions of Sec. 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders.

The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior.

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Officer in Charge.

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Students in the Department of Petroleum Engineering at the Colorado School of Mines are studying The Oil and Gas Journal's technical articles to fit themselves for their future work. Referring to reprints of technical articles from The Oil and Gas Journal, Professor P. F. Shannon, professor of Petroleum Engineering at the Colorado school, Golden, Colo., writes February 11 as follows:

> "These booklets on technical phases of the industry would be of interest and value to some forty upperclassmen enrolled in the courses leading to the degree of Petroleum Engineering. If you will send them to me I will be pleased to distribute them with the compliments of your magazine or I can send you their names and addresses if you prefer to send them individually.
>
> "I recommend that our juniors and seniors subscribe to your excellent magazine and many do."

The staff of the Department of Petroleum Engineering at Golden consists of the following professors: R. C. Beckstrom, refining; P. F. Shannon, production; C. F. Barb, refining, and Russell H. Volk, production.

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Oklahoma-Kansas and Eastern Pipe Line Report

OKLAHOMA-KANSAS

Pipe Line Statement for December

Runs

	Month	Dy. Av.
*Prairie Pipe Line Co.	4,588,000	148,000
Gulf Pipe Line Co.	1,599,078	51,583
Texas Pipe Line Co.	1,299,930	45,159
Magnolia Petroleum Co.	2,037,196	65,716
Empire Pipe Line Co.	996,436	32,142
Cosden Pipe Line Co.	922,071	29,745
Sinclair Pipe Line Co.	2,765,257	88,879
Oklahoma Pipe Line Co.	3,524,893	113,706
Other lines	7,812,000	252,000
Total December	25,634,861	826,931
Total November	26,397,277	879,908
Difference	762,416	52,977

Shipments

†Prairie Pipe Line Co.	5,344,811	172,413
Gulf Pipe Line Co.	1,430,717	46,151
Texas Pipe Line Co.	1,026,540	33,114
Magnolia Pipe Line Co.	1,919,704	61,926
Empire Pipe Line Co.	1,173,543	37,856
Cosden Pipe Line Co.	961,640	31,021
†Sinclair Pipe Line Co.	2,760,260	89,039
Oklahoma Pipe Line Co.	3,756,872	121,189
*Other lines	7,471,000	241,000
Total December	25,845,087	833,709
Total November	25,916,037	863,867
Difference	70,950	30,158

Stocks

Prairie Oil & Gas Co.	32,020,000
Prairie Pipe Line Co.	2,500,000
Gulf P. L. Co. & Gypsy Oil Co.	10,305,347
The Texas Company	6,034,232
Magnolia Petr. Co.	7,027,436
Empire P. L. Co.	4,400,428
Cosden P. L. Co.	3,365,765
Sinclair Crude Oil Pur. Co.	20,870,000
Oklahoma P. L. Co.	2,705,692
Carter Oil Co.	15,832,798
Other lines	11,600,000
Total December	116,671,808
Total November	114,952,561
Difference	1,719,247

*Estimated. †Prairie shipments include Texas crude oil and Sinclair shipments include Texas and Wyoming crude oil.

Note: Stocks do not include approximately 6,000,000 bbls. of crude oil held in storage on private tank farms and leases and 1,500,000 bbls. of Texas Panhandle crude oil in storage in Oklahoma and Kansas.

EASTERN PIPE LINES

Runs from Wells

In the following table will be found the regular receipts from wells by various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky and Indiana for November and December:

	Nov., 1927	Dec., 1927
Nat. Transit	138,691.66	135,569.47
S. W. Pa. P. L.	85,335.67	83,623.37
Eureka P. L.	364,643.27	357,187.03
Buckeye P. L. (Macksb'g)	314,900.41	317,414.13
Buckeye P. L. Cleve.)	12,030.90	11,590.15
Buckeye P. L. (Lima, etc.)	105,956.52	104,526.08
Indiana P. L.	7,189.17	7,062.60
Cum'land P. L.	236,613.60	226,646.39
N. Y. Transit	21,173.39	22,279.13
Tidewater P. L.	182,622.58	184,686.44
Pure Oil	152,816.95	100,041.39
Emery P. L.	56,468.37	56,212.05
Paragon Dev.	27,069.78	25,971.71
Stoll Oil Ref.	12,844.77	12,870.98
Total	1,718,256.14	1,645,678.31
Daily average	57,275.20	53,088.32

Note: Indian Refining Co. also reported other receipts of 307,806.71 bbls. Paragon Refining Co. had other receipts of 152,908.52 bbls. Paragon Development had other receipts of 1,398.77 bbls.

Petroleum Deliveries

The following tables exhibit the shipments or regular deliveries of various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky and Indiana for November and December:

	Nov., 1927	Dec., 1927
Nat. Transit	319,056.21	433,663.76
S. W. Pa. P. L.	375,867.86	374,669.27
Eureka P. L.	192,433.73	194,894.42
Buckeye P. L. (Macksb'g)	152,463.55	134,693.87
Buckeye P. L. (Cleve.)	969.42	1,211.35
Buckeye P. L. (Lima, etc.)	1,013,132.41	846,994.35
Indiana P. L.	1,116,002.96	1,152,206.72
Cum'land P. L.	145,443.98	144,182.95
N. Y. Transit	175,265.57	141,302.60
Northern P. L.	178,350.74	176,227.13
Tidewater P. L.	111,596.80	166,569.38
Pure Oil	177,134.58	123,788.25
Emery P. L.	54,750.52	56,494.34
Paragon Ref.	168,346.24	150,525.40
Indian Ref.	319,181.35	362,972.95
Paragon Dev.	29,362.95	28,229.67
Total	4,529,263.92	4,479,636.91
Daily average	150,975.46	144,504.42

Gross Stocks

The gross stocks held by various pipe lines in the oil-producing sections of New York, Pennsylvania, West Virginia, Ohio, Indiana and Kentucky at the close of November and December:

	Nov., 1927	Dec., 1927
Nat. Transit	1,108,601.66	1,187,950.33
S. W. Pa. P. L.	715,534.91	739,481.15
Eureka P. L.	1,729,737.61	1,702,402.79
Buckeye P. L. (Macksb'g)	396,287.93	435,355.19
Buckeye P. L. (Cleve.)	50,691.02	41,685.80
Buckeye P. L. (Lima, etc.)	4,695,838.16	4,943,834.32
Indiana P. L.	647,290.51	644,480.35
Cum'land P. L.	594,822.46	614,861.45
Southern P. L.	386,756.90	409,639.89
N. Y. Transit	510,190.02	509,588.23
Northern P. L.	547,199.31	537,115.66
Pure Oil	394,386.96	369,284.08
Emery P. L.	12,543.82	1,686.27
Paragon Ref.	13,179.46	15,272.42
Indian Ref.	129,403.23	71,648.15
Paragon Dev.	7,276.85	6,009.77
Total	11,939,740.93	12,340,397.25
Decrease	107,919.71	
Increase		400,656.32

Grades of Oil

The following table shows the amount of the different grades of oil held by the Eastern pipe lines at the close of November and December, showing the gross stocks of the above fields:

	Nov., 1927	Dec., 1927
Penn'a	4,076,710.10	4,226,582.93
Lima	1,177,864.75	1,196,691.27
Kentucky	1,089,357.44	1,009,560.04
Mid-Continent	5,519,125.93	5,855,777.40
Illinois	76,182.66	52,685.61
Total	11,939,740.93	12,340,397.25

Daily Average Runs

The following table shows the daily average runs of the Pennsylvania, Lima and Kentucky oil fields for the past four years:

	1924	1925	1926	1927
Jan.	62,628	56,831	55,630	56,209
Feb.	65,023	60,606	60,894	61,298
Mar.	66,721	60,575	61,644	63,247
April	71,048	62,062	63,019	60,337
May	63,942	59,217	60,580	60,284
June	63,230	61,270	64,131	62,757
July	64,208	62,639	63,206	58,574
Aug.	59,942	59,686	61,815	60,870
Sept.	62,930	62,510	64,639	60,385
Oct.	64,976	60,995	62,704	57,499
Nov.	56,282	59,350	61,774	57,275
Dec.	56,814	57,974	58,755	52,059

Daily Average Shipments

The following table gives daily average shipments from the Pennsylvania, Lima and other fields for the past four years:

	1924	1925	1926	1927
Jan.	146,518	157,889	156,056	141,227
Feb.	148,732	160,863	159,488	138,534
Mar.	147,098	154,591	160,229	133,777
April	147,611	151,429	152,371	140,227
May	134,997	146,995	160,993	144,394
June	143,010	149,467	160,257	149,772
July	124,187	161,338	160,005	151,359
Aug.	123,120	161,730	161,929	148,668
Sept.	127,325	156,719	158,915	144,213
Oct.	123,170	145,388	161,132	147,036
Nov.	124,400	143,582	152,668	150,975
Dec.	151,392	150,162	136,428	144,504

Gross Stocks

In the following table will be found the gross stocks of the various lines of the Pennsylvania, Lima and Kentucky oil fields, including oil received from other lines at the close of each month for the past three years:

	1925	1926	1927
Jan.	11,353,276	9,859,170	9,718,063
Feb.	11,192,924	9,579,354	10,119,102
Mar.	11,158,297	9,438,292	10,794,944
April	11,062,082	9,805,851	11,113,295
May	11,207,562	9,531,767	11,359,331
June	11,093,796	9,585,904	11,493,673
July	11,067,463	9,734,687	11,463,133
Aug.	10,974,481	9,168,947	11,989,135
Sept.	10,781,753	9,433,732	12,313,716
Oct.	11,036,850	9,269,806	12,047,661
Nov.	11,068,158	9,257,667	11,939,740
Dec.	10,458,445	9,454,512	12,340,397

Franklin Pipe Line Co.

The following table exhibits the condition of the Franklin Pipe Line at the close of business for the months named and not counted in the stocks and averages reported above:

1926—	Runs	Shipments	Stocks
Nov.	2,810.60	1,654.55	16,817.31
Dec.	2,847.53	5,561.11	13,103.73
1927—			
Jan.	2,641.54	1,470.42	14,274.84
Feb.	2,764.30	1,082.82	15,956.32
Mar.	2,587.20	1,878.56	16,664.96
April	2,834.23	1,512.65	17,986.54
May	2,765.40	539.29	20,216.73
June	2,946.29	664.40	22,497.61
July	3,152.39	1,276.61	24,373.39
Aug.	3,057.89	3,713.11	18,718.17
Sept.	3,309.56	2,656.48	19,372.25
Oct.	2,801.32	1,226.99	20,946.58
Nov.	2,746.50	2,220.53	21,472.55

The Illinois Field

The following table gives the report of the Illinois Pipe Line Co. in Illinois:

Gross stocks, Jan. 1	1,966,612.61
Other receipts	650,633.33
Runs from wells	187,892.36
Regular deliveries	352,391.94
Other deliveries	511,334.17

The amount of Illinois oil run by the Tide Water Pipe Co. in December was 26,491.91 bbls. and deliveries were 44,784.53 bbls. Adding these figures to those of the Illinois Pipe Line Co. makes the runs and deliveries as follows:

1926—	Runs	Deliveries
Dec.	668,909.58	837,847.61
1927—		
January	621,421.03	530,985.91
February	595,831.16	476,956.71
March	727,593.91	554,947.43
April	593,226.97	444,818.43
May	728,759.40	643,193.91
June	640,975.85	532,217.71
July	613,901.30	484,902.53
August	651,276.40	529,331.27
September	619,589.49	423,214.49
October	601,099.25	408,287.93
November	605,621.14	415,195.91
December	577,321.25	397,176.97

Tide Water Pipe Co., Ltd., also delivered in December 111,513.09 bbls. of Oklahoma oil.

AVERAGE DAILY RECEIPTS OF CALIFORNIA OIL AT ATLANTIC AND GULF COAST PORTS

Average bbls. per day—	ATLANTIC PORTS						GULF COAST PORTS						
	Baltimore	Boston	New York	Philadelphia	Others	Total	Galveston	New Orleans Baton Rouge	Port Arthur Sabine Pass	Tampa	Total	Total All Ports
August	18,616	2,065	46,129	17,323	26,909	113,032	.....	.....	.....	.....	.....	113,032
September	23,033	6,967	51,400	14,567	19,523	115,500	.....	.....	.....	.....	.....	115,500
October	20,936	4,355	47,968	14,129	14,387	101,774	.....	.....	.....	.....	.....	101,774
November	9,433	2,833	23,033	15,166	4,933	55,400	.....	.....	.....	.....	.....	55,400
December	10,742	3,033	30,258	24,387	7,065	75,484	.....	.....	.....	.....	3,613	79,097

AVERAGE DAILY IMPORTS OF PETROLEUM AT PRINCIPAL UNITED STATES PORTS

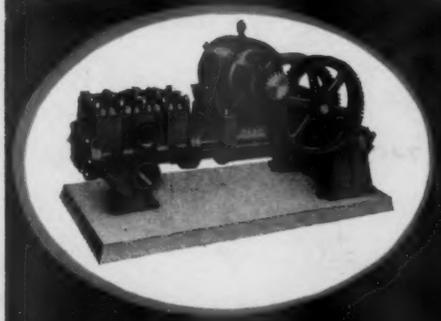
Average bbls. per day—	ATLANTIC PORTS						GULF COAST PORTS					
	Baltimore	Boston	New York	Philadelphia	Others	Total	Galveston	New Orleans Baton Rouge	Port Arthur Sabine Pass	Tampa	Total	Total All Ports
August	19,323	9,032	80,903	14,258	31,821	155,337	2,097	21,161	.....	.....	23,258	178,595
September	28,933	11,433	85,500	12,300	37,700	175,867	5,667	19,233	.....	3,600	28,500	203,367
October	26,064	13,097	79,355	3,838	34,097	156,451	1,613	19,323	806	1,871	23,613	180,064
November	35,233	8,033	84,533	20,100	27,067	184,967	4,000	26,500	2,000	1,667	34,167	219,133
December	39,968	2,387	78,963	19,097	29,836	170,253	2,530	15,356	839	1,226	20,000	190,253

GROSS PRODUCTION IN UNITED STATES FOR 12 MONTHS (REVISED)

(In Barrels)

1927—		California	Oklahoma	Texas	Kansas	Arkansas	Louisiana	Rocky Mountains	Eastern Fields	Total
January:	Month	20,184,872	19,035,426	18,565,156	3,769,879	4,076,469	1,945,777	2,648,920	3,332,500	73,558,999
	Daily average	651,125	614,046	598,876	121,609	131,499	62,767	85,449	107,500	
February:	Month	17,982,711	19,752,248	16,425,416	3,352,076	3,574,256	1,842,400	2,439,864	3,007,200	68,376,371
	Daily average	642,240	705,441	586,622	119,717	127,652	65,800	87,138	107,400	
March:	Month	19,835,724	22,480,921	18,179,491	3,675,143	3,853,920	2,086,108	2,684,724	3,335,800	76,131,831
	Daily average	639,863	725,191	586,435	118,553	124,320	67,294	86,604	105,100	
April:	Month	19,493,825	22,208,130	17,755,930	3,516,930	3,378,240	2,039,550	2,671,830	3,474,000	74,538,435
	Daily average	649,794	740,271	591,864	117,231	112,608	67,985	89,061	115,800	
May:	Month	19,506,054	23,258,463	19,489,607	3,704,314	3,493,669	1,984,651	2,682,151	3,467,000	77,585,909
	Daily average	629,228	750,273	628,697	119,494	112,699	64,021	86,521	111,839	
June:	Month	19,181,442	22,830,330	18,360,450	3,427,580	3,365,760	1,929,180	2,634,570	3,330,000	75,060,313
	Daily average	639,381	761,011	612,015	114,586	112,192	64,006	87,819	111,000	
July:	Month	19,319,021	26,522,546	17,580,348	3,454,032	3,406,683	2,311,019	2,678,679	3,363,300	78,635,673
	Daily average	623,194	855,566	567,108	111,422	109,893	74,549	86,409	108,484	
August:	Month	19,279,131	26,283,350	17,682,927	3,442,240	3,242,600	2,231,202	2,489,021	3,571,000	78,221,471
	Daily average	621,907	847,850	570,417	111,040	104,500	71,974	80,291	115,194	
September:	Month	19,064,500	24,111,660	18,322,800	3,241,340	3,032,970	2,027,070	2,268,630	3,465,000	75,632,970
	Daily average	635,483	803,722	610,760	111,278	101,099	67,569	75,621	111,774	
October:	Month	19,448,893	24,247,953	19,200,098	3,509,169	3,117,298	2,058,889	2,258,885	3,400,000	77,240,235
	Daily average	627,384	782,163	619,358	113,199	100,555	66,416	72,867	109,677	
November:	Mon.h	18,516,467	23,083,380	18,628,290	3,213,650	2,906,760	1,956,960	2,234,730	3,302,500	73,942,737
	Daily average	617,216	769,446	620,943	110,455	96,892	65,232	74,491	110,083	
December:	Month	19,938,823	22,208,417	19,840,009	3,427,174	2,962,750	1,927,146	2,400,578	3,219,900	74,924,799
	Daily average	610,930	716,400	640,000	110,554	95,576	62,166	77,438	103,868	
	Total 12 months	230,751,463	276,023,024	220,930,512	41,942,577	40,411,275	24,230,954	30,092,582	40,268,200	903,850,587
	Daily average	632,196	756,225	602,823	114,914	110,716	66,660	82,445	110,324	2,476,305

HEADQUARTERS for Motorized Pumps



The growing trend toward electrification of pumping equipment is reflected in the constantly increasing demand for Gaso Motorized Pumps. The Midwest Refining Co., Manhattan Pipe Line Co., Humble Pipe Line Co., Mutual Oil Co., Shaffer Oil & Refining Co. and Pierce Petroleum Co. are a few of those we have recently served in this connection. Having made a thorough study of motor-driven pumps, we know the conditions that have to be met.

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for every oil industry need

MORE THAN 5000 FEET OF THIS HOLE SUCCESSFULLY DRILLED WITH

HUGHES ROCK BITS

THOMPSON NO. 1

Wirt Franklin & Cromwell Oil & Gas Co., Oklahoma County, Okla.

6660 feet of Rotary Hole

{ 4700 ft. 11" hole }
{ 1960 ft. 7⅞" hole }

7⅞" hole Drilled Entirely with
HUGHES ROCK BITS

Majority of Formation after 2000 ft.—gray lime and shale.

from Right to Left:

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L. C. Tompkins
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